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The Professional Geographer, Journal of the Association of American Geographers, 1785 Massachusetts Ave., N.W., Washington 6, D.C., is published bimonthly at Commercial Printing, Inc., State College, Pa. Annual subscription $5.00; single copies 85 cents (except special issues). Editor, Phyllis R. Griess; Associate Editor, George F. Deasy: Department of Geography, The Pennsylvania State University, University Park, Pa. Second class postage paid at University Park, Pa. **Postmaster: return undeliverable copies to Association of American Geographers, 1785 Massachusetts Ave., N.W., Washington 6, D.C., return postage for which is guaranteed.**

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THE PROFESSIONAL GEOGRAPHER

VOLUME XIII MAY 1961 NUMBER 3

CHANGING PATTERNS IN THE MINERAL ECONOMY OF THE UNITED STATES, 1939-1954*

E. Willard Miller
The Pennsylvania State University

THE MINERAL industries of the United States experienced marked changes between 1939 and 1954, the years of the two latest releases of the United States *Census of Mineral Industries*. In 1939, there were 872,429 employees in the American mining industry. By 1954, employees had decreased to 846,144, a decline of three per cent. During this period, however, value of mineral shipments increased, on a constant dollar basis, from some $6.7 to $15.1 billion, representing a gain of 126.3 per cent. *(1)*

This study will investigate two aspects of the mineral industries of the United States. First, what are the regional patterns of mineral production? Second, what changes have occurred in these mineral regions between 1939 and 1954? Answers to these questions will be obtained by statistical analyses presented in the form of tables and a map.

There are numerous criteria for measuring the significance of mining: employment, man-hours of work, value of shipments, value added in the mining process, capital invested, power consumed, and others. The areal distribution of the mining industry, and the determination of regional trends in the industry, could be measured in terms of any one of these statistical yardsticks. However, since employment criteria reveal a declining trend whereas value of mineral output indicates a rising trend at the national level, use of a single criterion may present a biased picture of actual conditions in individual mining regions. Therefore, in this study, both total employment and value of shipments are employed in combination to delimit mineral regions and determine regional trends.

Definitions and sources of data. The term mineral industries, as used in this study, includes all activities and establishments primarily related to mining. The term mining is employed in the broad sense to include extraction of all minerals occurring naturally: solids, such as coal and ores; liquids, such as crude petroleum; and gases, such as natural gas. Mining also includes quarrying, well operation, and milling and other preparation needed to render minerals marketable.

Data for this study are obtained primarily from the United States *Census of Mineral Industries* and the *Minerals Yearbook*. The first mineral census was taken in 1840; since then there have been 12 mineral censuses. The two most recent, those for 1939 and 1954, employ approximately the same industry and sub-industry classifications so that data for both years are basically comparable. The *Minerals Yearbook* has been published annually since 1882.

The United States *Census of Mineral Industries* presents the most complete data, by county units, on mining in the United States. However, because of the disclosure rule, certain figures for many counties are not given, information on value of shipments being withheld for a greater number of counties than information on number of employees. In contrast, the *Minerals Yearbook* presents most complete data by counties on value of shipment but has no figures on number of employees. The 1939 value of shipments by counties for petroleum, natural gas, and allied products is not included in either the *Census of Mineral Industries* or the *Minerals Yearbook*. Value data for these minerals, therefore, are obtained by calculating county production

from the handbook, *Oil and Gas Field Development in the United States and Canada: Yearbook 1940 (Review of 1939)*, and multiplying production figures by the unit value in a given area.

After employing the above sources, it is found that a considerable number of counties with known mineral production are not represented. Data for these counties are obtained from the undistributed figure remaining for each state. In order to achieve the most accurate county distribution possible, a variety of descriptive sources, such as publications of state geological surveys and the U.S. Bureau of Mines, are used to estimate employment and value of shipments within these counties.

This study does not include data on employment or value of shipments for uranium and other fissionable minerals. Such information is not released by governmental agencies. Omission of such material does not seriously affect the validity of the study.

Delimiting mineral regions. Demarcation of the mineral regions employed herein is derived by a series of steps. The initial step involves plotting of 1939 and 1954 data, by counties, on total employment and value of shipments for each of the three major mineral groups — fuels, metals, and nonmetals. The county unit is utilized, since it is the smallest areal unit for which statistics are available. During this procedure, it becomes apparent that essentially the same counties were producing minerals in 1939 as in 1954, and that frequently more than one of the three groups of minerals is mined in the same area.

Because this study is concerned with the total mineral economy of a region, the second step is compilation of maps, by county units, showing total employment and value of shipment resulting from all mining activity. This step reveals that more than 95 per cent of the counties in the United States have some mineral production. However, in this study, all counties with fewer than 50 employees or producing less than $200,000 of mineral wealth, in either 1939 or 1954, are eliminated from consideration.

The third step is determination of the dominant mineral group produced in each county, and the delimitation of mineral areas based on such a criterion. Because mining is not a continuous areal phenomenon, mineral regions frequently are made up of a number of unconnected districts with similar mineral production. Isolated areas of mining, consisting of one or more districts with a combined total of fewer than 350 employees or less than $5 million value of shipments in either 1939 or 1954, are not defined as regions. The mineral regions which are thus delimited possess 96.64 per cent of total employees, and account for 97.94 per cent of the value of shipments, in the American mineral industries in 1954. Whenever possible, traditional names are applied to the mineral regions. However, many mineral areas are not previously defined, and new regional names have had to be developed. This applies particularly to the nonmetals regions.

By utilizing the above method, 39 mineral regions are defined in the United States (Fig. 1). Of these, 16 are dominated by metals, 12 by fuels, and 11 by the nonmetals. Because mineral deposits differ greatly in areal extent, the 39 mineral regions range in size from minute to extremely large. The intensity of mineral productivity by region also differs considerably. For example, employment at, and value of shipments from, a single copper mine may be much greater than employment at, and value of shipments from, a large number of sand and gravel pits distributed over a much larger area. Consequently, the importance of a region to the total national mineral economy is not measurable by its areal extent.

Computation of magnitude. The second objective of this study is to investigate changes in magnitude, between 1939 and 1954, in the mineral economy of each of the 39 mineral regions. Magnitude in this study refers to the relative significance or importance of the mining activity in each region. As in the previous section, the criteria of both total employment and value of shipments are utilized. Values for the two criteria are averaged to determine the magnitude of mining in each mineral region, for both 1939 and 1954. The two criteria are arbitrarily weighted

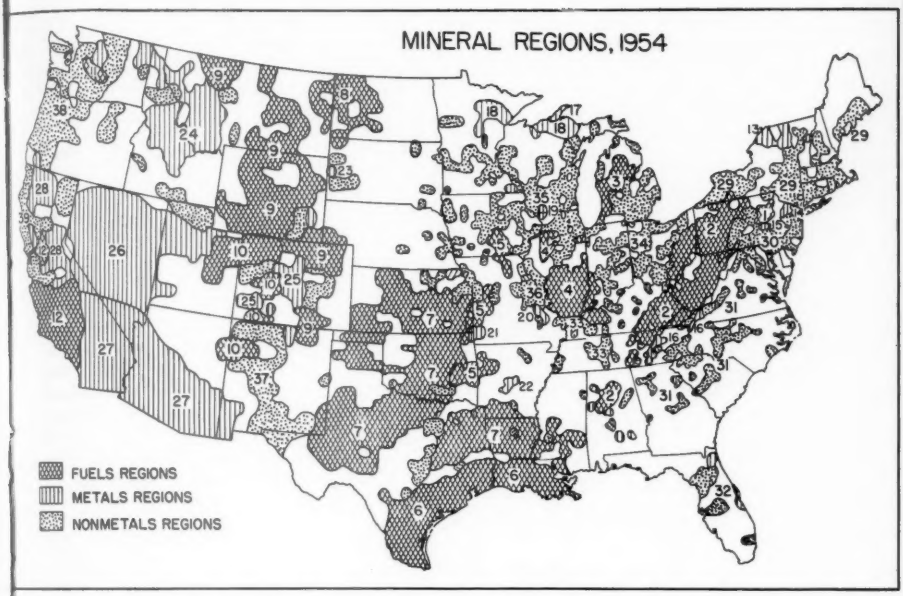

FIG. 1. Mineral regions of the United States. *Fuels regions:* 1 – Northeast Pennsylvania, 2 – ppalachian, 3 – Central Michigan, 4 – Eastern Interior, 5 – Western Interior, 6 – Gulf Coast, 7 – idcontinent, 8 – Williston Basin, 9 – Northern Great Plains, 10 – Colorado Plateau, 11 – Western ashington, 12 – Southern California. *Metals regions:* 13 – Adirondacks, 14 – Northern New Jersey, 5 – Cornwall-Morgantown, 16 – Great Smokies, 17 – Keweenaw, 18 – Upper Great Lakes, 19 – uthwest Wisconsin, 20 – Southeast Missouri, 21 – Tri-State, 22 – Central Arkansas, 23 – Black lls, 24 – Northern Rocky Mountains, 25 – Central Rocky Mountains, 26 – Northern Great Basin, – Southern Great Basin, 28 – Northern California. *Nonmetals regions:* 29 – Northeast, 30 – Mid- le Atlantic, 31 – Piedmont, 32 – Florida, 33 – South Central, 34 – East Central, 35 – Northern In- ior, 36 – Eastern Missouri, 37 – Southwest, 38 – Northwest, 39 – Western California.

equally. The magnitude formula may be expressed as

$$M = \frac{En + Vs}{2}$$

where M is the magnitude of mining, En is the total number of employees as a percentage of the United States total, and Vs is the value of shipments as a percentage of the United States total (Tables I and II).

Combination of the two criteria tends to reduce regional peculiarities that would result from use of a single criterion. This factor is particularly important in the mineral industries, where certain types of minerals require a small labor force and others a large labor force in relation to value of product. For example, in 1939 the Northeast Pennsylvania Region of anthracite production employed 10 per cent of the nation's total mining personnel, but produced only 5.56 per cent of the value of mineral shipments. In contrast, corresponding figures for the Midcontinent oil region were 14.00 and 24.75 per cent.

Changes in magnitude, 1939-1954. Changes between 1939 and 1954 in the magnitude of the mineral industries of the 39 mineral regions are discussed below. Materials are organized on the basis of fuels, metals, and nonmetals regions.

Fuels regions. In 1939, fuels regions accounted for 80.58 per cent of the total

TABLE I

MAGNITUDE OF MINING IN 39 MINERAL REGIONS OF THE UNITED STATES, 1939

	Employment	*Value of Shipment (millions)*	*En (see text)*	*Vs (see text)*	*Magnitude of Mining (see text)*
United States	872,429	$6,691.3	100.00	100.00	100.00
Fuels Regions	715,944	5,283.2	82.11	79.05	80.58
1. Northeast Pennsylvania	87,264	371.8	10.00	5.56	7.78
2. Appalachian	341,359	1,280.7	39.15	19.16	29.16
3. Central Michigan	3,948	47.1	0.46	0.71	0.58
4. Eastern Interior	65,407	496.0	7.50	7.43	7.46
5. Western Interior	13,849	44.4	1.67	0.67	1.17
6. Gulf Coast	33,411	619.3	3.82	9.25	6.53
7. Midcontinent	122,190	1,654.9	14.00	24.75	19.38
8. Williston Basin	1,116	4.8	0.13	0.09	0.11
9. Northern Great Basin	11,017	81.7	1.26	1.23	1.25
10. Colorado Plateau	5,173	22.6	0.60	0.34	0.47
11. Western Washington	2,735	10.3	0.25	0.15	0.20
12. Southern California	28,475	649.6	3.27	9.71	6.49
Metals Regions	98,390	1,037.5	11.16	15.48	13.32
13. Adirondacks	1,538	9.8	0.17	0.14	0.15
14. Northern New Jersey	2,341	16.2	0.26	0.25	0.26
15. Cornwall-Morgantown	264	12.8	0.03	0.20	0.11
16. Great Smokies	2,700	8.0	0.30	0.11	0.21
17. Keweenaw	3,417	18.8	0.39	0.28	0.33
18. Upper Great Lakes	14,240	259.5	1.63	3.89	2.76
19. Southwest Wisconsin	176	1.3	0.02	0.01	0.01
20. Southeast Missouri	2,777	25.2	0.35	0.37	0.36
21. Tri-State	5,337	34.8	0.61	0.52	0.57
22. Central Arkansas	939	5.6	0.01	0.08	0.04
23. Black Hills	2,434	43.2	0.27	0.64	0.45
24. Northern Rocky Mts.	14,433	114.2	1.65	1.71	1.68
25. Central Rocky Mts.	10,539	80.7	1.25	1.20	1.23
26. Northern Great Basin	13,386	156.2	1.50	2.33	1.92
27. Southern Great Basin	15,338	160.4	1.75	2.40	2.08
28. Northern California	8,531	90.8	0.97	1.35	1.16
Nonmetals Regions	47,468	248.7	5.46	3.66	4.56
29. Northeast	7,665	50.1	0.87	0.73	0.80
30. Middle Atlantic	6,370	37.0	0.73	0.56	0.64
31. Piedmont	8,257	24.2	0.99	0.34	0.67
32. Florida	2,914	18.0	0.35	0.26	0.33
33. South Central	1,871	8.8	0.21	0.13	0.17
34. East Central	7,674	37.0	0.87	0.56	0.72
35. Northern Interior	5,774	18.5	0.66	0.27	0.46
36. Eastern Missouri	1,528	6.4	0.17	0.09	0.13
37. Southwest	1,339	20.4	0.15	0.30	0.22
38. Northwest	2,139	6.2	0.24	0.09	0.16
39. Western California	1,937	22.1	0.22	0.33	0.27
Scattered	10,627	121.9	1.27	1.81	1.54

TABLE II

MAGNITUDE OF MINING IN 39 MINERAL REGIONS OF THE UNITED STATES, 1954

	Employment	*Value of Shipment (millions)*	*En (see text)*	*Vs (see text)*	*Magnitude of Mining (see text)*
United States	846,144	$15,147.2	100.00	100.00	100.00
Fuels Regions	639,022	12,502.8	75.52	82.60	79.06
1. Northeast Pennsylvania	39,230	408.4	4.64	2.69	3.66
2. Appalachian	223,637	2,046.5	26.43	13.51	19.97
3. Central Michigan	3,483	67.7	0.41	0.44	0.42
4. Eastern Interior	45,223	720.3	5.34	4.75	5.05
5. Western Interior	4,546	50.7	0.54	0.33	0.44
6. Gulf Coast	92,288	2,642.5	10.91	17.44	14.17
7. Midcontinent	170,110	4,531.6	20.10	29.93	25.01
8. Williston Basin	1,251	29.0	0.15	0.19	0.17
9. Northern Great Plains	15,074	437.0	1.78	2.89	2.33
10. Colorado Plateau	9,692	132.6	1.14	0.87	1.02
11. Western Washington	1,159	9.8	0.14	0.15	0.14
12. Southern California	33,329	1,426.7	3.94	9.41	6.68
Metals Regions	114,487	1,625.3	13.55	10.78	12.16
13. Adirondacks	4,989	49.7	0.60	0.32	0.46
14. Northern New Jersey	2,622	30.4	0.31	0.20	0.25
15. Cornwall-Morgantown	416	20.5	0.05	0.13	0.09
16. Great Smokies	2,795	14.4	0.33	0.10	0.21
17. Keweenaw	3,100	22.2	0.37	0.14	0.25
18. Upper Great Lakes	28,837	409.7	3.41	2.70	3.06
19. Southwest Wisconsin	351	6.0	0.04	0.04	0.04
20. Southeast Missouri	3,861	46.2	0.46	0.31	0.39
21. Tri-State	2,036	26.4	0.24	0.17	0.20
22. Central Arkansas	2,065	31.4	0.25	0.21	0.23
23. Black Hills	1,790	19.2	0.21	0.12	0.17
24. Northern Rocky Mts.	14,680	152.5	1.73	1.01	1.37
25. Central Rocky Mts.	9,730	96.3	1.15	0.63	0.89
26. Northern Great Basin	13,668	331.3	1.62	2.18	1.90
27. Southern Great Basin	21,204	349.3	2.50	2.39	2.45
28. Northern California	2,343	19.8	0.28	0.13	0.20
Nonmetals Regions	64,142	705.3	7.57	4.56	6.07
29. Northeast	10,002	95.7	1.18	0.61	0.89
30. Middle Atlantic	6,920	80.9	0.82	0.53	0.68
31. Piedmont	9,986	47.7	1.17	0.30	0.73
32. Florida	5,345	99.1	0.64	0.63	0.64
33. South Central	1,567	24.8	0.18	0.16	0.17
34. East Central	12,215	119.2	1.44	0.78	1.11
35. Northern Interior	7,837	87.5	0.93	0.57	0.75
36. Eastern Missouri	1,166	9.7	0.14	0.06	0.10
37. Southwest	4,939	78.1	0.58	0.51	0.55
38. Northwest	2,195	24.6	0.26	0.61	0.21
39. Western California	1,970	38.0	0.23	0.25	0.24
Scattered	28,493	313.8	3.36	2.06	2.71

American mining industry (Table I). By 1954, this figure had declined slightly to 79.06 per cent (Table II). Of the 12 fuels regions, six declined and six increased in magnitude. Five regions dominated by coal production — Northeast Pennsylvania, Appalachian, Eastern Interior, Western Interior, Western Washington — declined from 45.77 per cent of the mining industry in 1939 to 29.26 per cent in 1954. Of these regions, Northeast Pennsylvania and the Western Interior experienced greatest relative decline. The Central Michigan Region, chiefly a petroleum area, also declined in importance.

Six regions dominated by petroleum and natural gas production — Gulf Coast, Midcontinent, Northern Great Plains, Colorado Plateau, Southern California, Williston Basin — increased in importance. In 1939, these regions accounted for 34.23 per cent of the total American mineral industry. By 1954, the percentage had risen to 49.38. The Gulf Coast experienced the greatest relative increase among the six regions, rising from 6.53 to 14.17 per cent.

Metals regions. Metals regions as a whole declined slightly in magnitude, from 13.32 per cent of total mining in 1939 to 12.16 per cent in 1954. Of the 16 individual metals regions, nine decreased, six increased, and one experienced no change.

Iron ore areas of the Adirondacks and Upper Great Lakes experienced notable increases. The Central Arkansas bauxite area also recorded significant growth. Lead producing districts of Southeast Missouri and Southwest Wisconsin, as well as the copper region of the Southern Great Basin, increased in magnitude.

In contrast, gold producing areas of Northern California and the Black Hills were characterized by great decreases. Other metals regions which declined in importance include the Tri-State zinc-lead district, Northern and Central Rocky Mountains non-ferrous-ferro alloy areas, the Northern Great Basin and Keweenaw copper areas, the Northern New Jersey zinc area, and the Cornwall-Morgantown iron ore area.

The Great Smokies non-ferrous-ferro alloy region maintained its relative magnitude.

Nonmetals regions. The 11 nonmetals regions in 1939 accounted for 4.56 per cent of the total national mineral economy. By 1954, this figure had risen to 6.07 per cent. Eight regions increased in magnitude, two decreased, and one registered no change. Of those that increased, the Southwest and Florida regions, dominated by potash and phosphate production respectively, experienced greatest growth. The East Central and Northern Interior areas, with rising production of sand, gravel, salt, and stone, also recorded significant increases. In general, however, changes in magnitude among the nonmetals regions were quite small.

Summary. The foregoing study on the location of, and changes in, the American mineral economy is primarily a statistical measurement of the importance of mining in various regions at two specified dates. No attempt is made to interpret the changes that have occurred, nor to explain the magnitude of mining in individual regions. Additional and detailed studies are needed to probe such problems. This paper, presenting an overview of the total United States mineral economy, sets the stage for further investigation. By comprehension of the whole, it is hoped that individual regions may be more readily analyzed. Conversely, through detailed regional analysis, the total mineral economy will become more adequately known.

° ° °

(°) Contribution No. 60-98 from the College of Mineral Industries, The Pennsylvania State University. Based on a paper presented at the International Geographical Congress of the IGU in Stockholm, August, 1960. The writer wishes to express his thanks to George Schnell, Lee Hopple, and Joseph Gregory, graduate assistants in the Department of Geography of The Pennsylvania State University, who aided in the collection of statistics for this article.

(1) All 1939 value-of-shipment figures in this paper are converted to 1954 dollars through use of conversion tables contained in *Wholesale Price and Price Indexes*, U.S. Department of Labor, Bureau of Labor Statistics. Values are: 1939=100; 1954=196.

LAND ELEVATION, AGE OF DWELLING STRUCTURE, AND RESIDENTIAL STRATIFICATION*

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THE PROBABLE association between land elevation and residential stratification has been alluded to by social scientists *(1)*, architects *(2)*, and housing specialists. *(3)* In general, they have observed that expensive housing is often erected on hilly sites. However, this investigator has not seen a systematic analysis of the probable association between these two phenomena at varying levels of stratification and elevation, including low and high status neighborhoods and flat as well as hilly terrain. Are expensive dwelling units erected, also, on flat surface areas? The observation reported above does not answer this or other questions regarding the continuity of association, if any, between residential stratification and land elevation.

The purpose of this paper is to explore the association between land elevation and residential stratification in an urban community. Tested is the null hypothesis, namely, that there is no association between the two variables.

Of secondary consideration in this study is the association, if any, between age of dwelling structure and land elevation. This variable was brought into the study because of its documented association with residential stratification. *(4)* Were an association found between land elevation and residential stratification, responsibility would devolve upon the investigator to determine whether land elevation had an independent association with residential stratification or was, in fact, but another example of the known association between dwelling structure age and the socio-economic status level of residential areas.

Data and method. The study area was Syracuse, New York, an industrial city approximately 25 square miles in size with a population of 220,583 persons in 1950, the study year. Census tracts were used as basic geographic units of analysis. There are 61 such tracts in Syracuse, 59 of which were used in this study. One tract was omitted because of its special institutional population, and another because of its sparse settlement of less than 50 persons.

A contour map of the city, based on findings of a survey conducted by the United States Department of Interior, was used to determine the elevation of census tracts. Because each census tract in Syracuse is relatively homogeneous and small—the average tract being less than two-fifths of a square mile — the land elevation at its center was more or less representative of the total census tract area. Land elevation was estimated for the center of all 59 tracts. It varied from a low of 373 feet to a high of 605 feet above sea level. Average elevation above sea level for the total city was 467 feet.

Residential areas of varying socio-economic status were delineated on the basis of an analysis of the frequency distribution of composite socio-economic status scores, building permits, real estate advertisements, historical documents, interview data, and inspection of neighborhoods. The principal instrument in delineating residential areas of varying status levels was the composite socio-economic index. It consisted of five variables: average home value; average monthly rental; per cent of single-family dwelling units; median school year completed by the adult population over 25 years of age; and per cent of workmen in the combined occupational categories of operatives, service workers, and laborers. The latter component was inverted so that it would vary directly with the other four. Excepting the percentage of single-family dwelling units, all variables intercorrelated with each other at .80 and above. The excepted variable intercorrelated with the other four at .59 and above. Thus, a significant and high association existed between the socio-economic variables. Dis-

tributions of each variable by census tracts were converted into standard scores and integrated into a composite socio-economic index. An average index score was derived for each census tract. A frequency distribution of index scores by census tracts was made, and tracts with similar scores were combined into a socio-economic residential area.

Six socio-economic residential areas were delineated in Syracuse. *(5)* They varied from Area I in which a majority of persons were professional, technical, or managerial workers, graduates from high school and college, and owners of expensive well-kept homes, to Area VI in which a majority of the persons were operatives, service workers, or laborers, had received no more than an elementary school education, and rented dwelling units in old and dilapidated structures.

To explore the secondary consideration of dwelling structure age and residential stratification, the median year of dwelling unit construction in each census tract was computed. Dwelling units in multiple-family structures, that were converted from single-family structures, were assigned the age of the structure in which it was located in Census Bureau tabulations. About half of the dwelling units in Syracuse, which was founded in 1825, were erected before 1895. By census tracts, the median year of dwelling unit construction ranged from 1873 to 1934.

Land elevation, year of dwelling unit construction, and socio-economic status data were statistically analyzed by census tracts and by residential areas to determine the presence or absence of significant associations.

Findings. There was a direct and significant association between land elevation and socio-economic status. By census tracts, these two variables intercorrelated at .73. More than half of the variance in the composite socio-economic score of census tract neighborhoods could be attributed to their elevation above sea level, as indicated by the Pearson correlation coefficient.

The significant correlational association between land elevation and residential stratification was further documented by analysis of data presented in Table I. About 40 per cent of the city's total area is less than 425 feet above sea level; another 40 per cent is between 425 and 525 feet; and about 20 per cent is 525 feet or more above sea level.

That portion of the city with an elevation of less than 425 feet is largely flat land found in and around the center of the city, along its lake shores, and in valley routes that funneled traffic from north-south and east-west directions into Syracuse during the nineteenth century. Nearly 90 per cent of Area VI, the lowest in socio-economic status, was found in the old and flat section of the city. On the other hand, 75 per cent of Area I, the highest in socio-economic status, was found on hilly terrain more than 525 feet above sea level. This section, incidentally, was settled largely during the twentieth century.

TABLE I

PERCENTAGE DISTRIBUTION OF SOCIO-ECONOMIC AREAS, BY ELEVATION OF RESIDENTIAL AREA ABOVE SEA LEVEL, SYRACUSE, 1950

Socio-Economic Area	*Square Miles*	*Percentage of Sauare Miles by Land Elevation*		
		Below 425 ft.	*425 thru 524 ft.*	*Above 524 ft.*
I	1.89	....	25	75
II	3.25	....	14	86
III	6.40	41	53	6
IV	3.41	33	60	7
V	3.36	33	67	....
VI	4.37	89	11	....
Total City	22.68[1]	39	40	21

[1] The total city area indicated in the table is less than 25 square miles because two of the 61 census tracts were omitted.

Another important fact revealed in the socio-economic area analysis had to do with upper and lower limits in the land elevation of residential neighborhoods of varying status. No sections of the two lower areas, V and VI, were located on sites above 525 feet; and no sections of the two higher areas, I and II, were located on sites below 425 feet. However, some portions of all socio-economic areas occupied a common range of 100 feet. Between 425 and 525 feet above sea level, there were neighborhoods of varying socio-economic status ranging from Area I through Area VI.

Thus, it was seen that a greater proportion of the highest socio-economic area was located on sites of higher elevation, and a greater proportion of the lowest socio-economic area was located on sites of lower elevation. Moreover, there was a definite limit of elevation below which the higher areas did not descend, and a definite limit of elevation above which the lower areas did not ascend. On the basis of these facts it would seem that an association between land elevation and residential stratification was demonstrated.

The conclusiveness of this analysis, however, was tempered by two facts: (a) a portion of all socio-economic areas, including a majority of the square mileage in the middle areas, III, IV and V, contained land of similar elevation; and (b) 47 per cent of the variance in the composite socio-economic score of census tract neighborhoods could not be accounted for by variation in land elevation, according to the correlation coefficient. Apparently a factor, or factors, other than land elevation had an effect upon the socio-economic status level of residential areas. It was noted earlier that the lowest socio-economic area was located in an old section of the city, whereas the highest area was in a recently settled section. Thus, the analysis was extended to determine: (a) the association, if any, between age of dwelling structure and residential stratification in Syracuse; and (b) the multiple contribution, if any, of age of dwelling structure and elevation of land above sea level to the socio-economic status level of residential areas.

Table II showed the expected association between year of dwelling unit construction and socio-economic status of residential areas. The association was linear, with a difference of 51 years between the 1930 average median year of dwelling unit construction in Area I and the 1879 average median year in Area VI. Also seen in Table II was a difference of 166 feet between the average elevation of 572 feet above sea level in Area I and the average elevation of 406 feet in Area VI. There was a tendency toward linearity in this distribution, with the exceptions of Areas III and IV. This distribution confirmed the earlier conclusion that an association existed between land elevation and residential stratification. At this point, however, the question to be answered was which variable

TABLE II

AVERAGE MEDIAN YEAR OF DWELLING UNIT CONSTRUCTION, AND AVERAGE ELEVATION OF RESIDENTIAL AREA ABOVE SEA LEVEL, SYRACUSE, 1950

Socio-Economic Area	*Average Median Year of Dwelling Construction*[1]	*Average Elevation Above Sea Level, in Feet*[2]
I	1930	572
II	1926	551
III	1923	450
IV	1899	464
V	1890	444
VI	1879	406
Total City	1907	467

[1] The median age of dwelling units was computed for each census tract. Medians of all census tracts in an area were averaged to obtain the average median age of dwelling units. Each median was weighted by the number of square miles in area census tracts.
[2] Each area average was weighted by the number of square miles in area census tracts.

made the greater contribution to residential stratification — the linear distribution of year of dwelling unit construction, or the partially linear distribution of land elevation above sea level?

A series of correlation coefficients, including a multiple correlation coefficient, were computed to solve the problem. The Pearson correlation coefficient, by census tracts, between socio-economic status and land elevation was .73; that between socio-economic status and year of dwelling unit construction was .83; and that between land elevation and year of dwelling unit construction was .62. The multiple correlation coefficient between the three variables was .87, indicating that 12 per cent of the variance in socio-economic status, by census tracts, could be attributed to land elevation, 38 per cent to year of dwelling unit construction, and 26 per cent to the joint action of these two variables. Thus, year of dwelling unit construction made the greater contribution to variation in socio-economic status by residential areas. Nevertheless, it was demonstrated that land elevation also made a significant and independent contribution, and thereby qualified as a new and different dimension of residential stratification. Age of dwelling unit continues to be probably the most significant single indicator of residential stratification, as defined by the five variable composite index used in this study. When correlated singly, about one-third of the variance in residential stratification remained unexplained; but, when year of dwelling unit construction was multiply correlated with land elevation, unexplained variance was reduced to slightly less than one-fourth.

Conclusion and discussion. The facts presented and analyzed in this study were sufficient to reject the null hypothesis that there is no association between land elevation and residential stratification. Land elevation had a significant and direct association with the socio-economic status level of residential areas. Neighborhoods of higher socio-economic status tended to be situated on sites of higher elevation; conversely, neighborhoods of lower status tended to be situated on sites of lower elevation.

However, the independent contribution of land elevation to residential stratification was far less than the contribution of year of dwelling unit construction. The age of dwelling units in a neighborhood was seen as one of the best single indicators of the socio-economic status level of a residential area.

In an urban community of differential terrain, one may account for about half of the variance in socio-economic status of residential areas if one has knowledge of neighborhood variations in elevation above sea level; about two-thirds of the variance may be accounted for if one has knowledge of the differential age of dwelling units by neighborhoods; and about three-fourths of the variance in socio-economic status by residential areas may be explained, if one has knowledge both of the age of dwelling units in neighborhoods throughout the city and their elevations above sea level.

Living on a site that has a "view" is valued highly in American culture, even though some elevated sites have become so congested that a view is no longer possible. Nevertheless, the fact that high status neighborhoods were originally associated with sites of higher elevation persists. It should be pointed out, however, that slums inhabit hilly sites in some countries. Thus, the association between land elevation and residential stratification must be interpreted as a cultural phenomenon. Also, there are economic factors associated with the tendency to erect expensive dwellings on sites of higher elevation. Site preparation is more expensive on hilly terrain. Hence, builders tend to erect higher priced property on such land.

The findings of this study strongly indicate that consideration should be given to the factor of differential land elevation in any comparative analysis of the ecology of an urban community organization. It is possible that discrepancies between competing theories of urban organization are, in part, a function of differential land elevation in the cities that were studied. This analysis further points toward the need to consider land elevation as a significant condition of urban organization, and to discover the various ways in which communities and societies have adapted themselves culturally to this universal condition of existence.

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(*) This article is a revision of a paper presented at the Eastern Sociological Society meeting in New York, April, 1959. Data were derived from a study conducted by the investigator while serving as research sociologist with the New York State Mental Health Commission on assignment from the Department of Sociology and Anthropology, Syracuse University. The project was supported by a grant from the Milbank Memorial Fund which is acknowledged with appreciation.

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GEOGRAPHY TEACHING LOADS IN AMERICAN UNIVERSITIES

Guy-Harold Smith

The Ohio State University

THE APPOINTMENT of a new faculty member to a department in a university, or the continued employment of personnel who have tenure or who may expect reappointment, usually implies some instructions in respect to the general terms of their employment. Other than the salary, which was discussed in an earlier article (1), the university or college teacher is vitally interested in the teaching load, both in respect to the number of contact hours and the size of the classes he teaches. He is also interested in the time he will have available to devote to service activities in the institution and in the community in behalf of his department. One of the most important fractions of his total work load is the time available for research or other personal activities of professional value to him. This presentation is concerned chiefly with teaching loads, but the other activities of the university teacher must come under scrutiny.

Preliminary comments. The author has had more than 25 years experience in making teaching schedules for his associates in a university that operates on a quarter system. He cannot claim that, in making more than 100 teaching schedules, he has achieved notable success, but his colleagues have usually accepted graciously their work loads in respect to hours and number of students. The teaching loads could have been held at lower levels if the department had resisted all pressures to keep the classes open to receive additional students or to open new sections to handle the increased enrollment. The department has chosen to be accommodating, but unfortunately additions to staff generally have not kept pace with the increase in enrollment.

If an instructor has assigned to him a graduate assistant or some other junior member of the staff who is qualified to handle a variety of assignments, such as taking attendance, conferring with students, and grading examinations and term papers, he will be able to carry a larger hour load than will an instructor who must do all of these things for himself. In many departments, an introductory course is handled in one or two large lecture sections and in several discussion or quiz sections, and an equal number of laboratory classes. An individual student may have two or

three lecture periods under a senior member of the staff, two quiz sections by a more junior member of the department and one or two two-hour laboratory periods conducted by graduate assistants or other members of the staff who are candidates for an advanced degree.

The senior professor who lectures to an elementary class may teach an upper division course that meets three times a week, and not uncommonly he has a second advanced course or seminar. His contact hours, representing the total number of hours he spends in the classroom, may total seven or eight. If he has important administrative or research assignments, his load may be further reduced by the equivalent of one regular assignment, thus reducing his contact hours to four or six.

The more junior member of the staff, perhaps at the rank of assistant professor, who has not become deeply involved in the administrative affairs of the university and who has not developed a time-consuming research program, may expect to carry regularly two or three courses with the contact hours ranging from eight to twelve depending upon the credit hours of the individual courses. Perhaps not every year, but frequently, he might expect to have a light quarter or semester by being assigned only two courses or two sections of the same course. On these occasions, when his teaching load has been reduced, he should be encouraged to concentrate his energies on research.

Teaching loads vary greatly among departments, as the following statements seem to indicate, but there are important differences within a single department. The chairman of a department may find, in spite of his attempts to encourage research and publication by all members of his staff, that certain persons develop teaching skills to a point where it is easy and perhaps wise to assign such persons greater responsibilities in the classroom than is modal for the department. The author has observed that individuals differ greatly in their wishes in respect to teaching loads. Some teachers must be protected against their own folly by limiting their teaching loads so that they will have time for research. What is said here is not intended to negate the strong suggestion that the best university teacher combines high skill as a teacher with a devotion to the objectives of scientific inquiry. Experienced administrators are familiar with the teacher who allows his commitment to teaching to interfere with his capacity for productive scholarship. Unhappily, there are persons who look upon teaching as a burdensome requirement of the job and devote as much time as possible to their research programs and their professional activities which for some may be financially rewarding.

Individual department teaching loads. Without further elaboration, the reports from 35 departments of geography are presented and should be examined carefully. The number of contact hours ranges from none in the classroom to a total of fifteen for younger members of the staff, who may teach as many as two or three sections of the same course. Teaching loads of eight to ten hours seem to be about average, with reduction of three or more for research, administration, committee assignments, and supervision of theses and dissertations.

Bowling Green State University: "The normal teaching load is 12 semester hours and, since only one of our courses involves laboratory work, this is practically equivalent to a teaching load of twelve contact-hours per week.

"This load does not vary with rank nor is there any adjustment for administrative assignment, committee work, supervision of theses, research or other activities. Branch instruction is included as part of the regular load but usually extension classes are carried as overload and are rewarded with extra pay." – Lowry B. Karnes

Clark University: "Our teaching loads are as follows: Van Valkenburg (Professor), 8 hours plus seminar; Murphy (Professor), 4 hours plus seminar (runs *Economic Geography*); Lougee (Professor—now deceased), 5 hours plus 2 hours laboratory and seminar; Warman (Professor), 8 hours plus seminar; Carol (Visiting Professor), 5 hours plus seminar; Burnham (Instructor), 4 hours plus map curator; Villmow (part time, first semester), 2 hours; Raisz (part time, second semester), 2 hours.

"Most of these hours are for graduate students only; we have relatively few un-

dergraduate courses . . . Graduate classes meet twice each week; undergraduate and mixed classes three times a week." – Samuel Van Valkenburg

Indiana University: "Contact hours average between 3-6 for full professors; 6 for associate professors; 6-9 for assistant professors and lower ranks. Student loads are . . . small (averaging 20-30), but exceed 300 for one full professor and 100 for another (namely me)." – George H.T. Kimble

Louisiana State University: "Requirements highly variable – 12 the base in Arts and Sciences, with reductions for administration, research, thesis guidance, etc." – Fred B. Kniffen

McGill University: "Professors, 6 undergraduate hours, 2-4 graduate hours; Associate Professors, 6-7½ undergraduate hours, 2-4 graduate hours; Assistant Professors, 0-10 undergraduate hours, 0-4 graduate hours; Lecturers, 4½-9 undergraduate hours, 0-2 graduate hours.

"We are fortunate in having no formal rules, and assign loads by mutual agreement, allowance being made for administration, research and research direction, and external activities of a constructive kind." – F. Kenneth Hare

Miami University (Oxford, Ohio): "At Miami, the full teaching load in terms of contact hours is 12 for each semester. In summer session, a full load is 6 periods (that is, the equivalent of 6 in the ordinary session). Departmental chairmen are allowed to carry 3 contact hours less than other members of the staff during the regular semester. . . ." – Henry M. Kendall

Michigan State University: "Our average teaching load varies from 8 to 12 teaching clock hours per week. The average student load was 212 contact hours per staff member per week during the fall term, 1959. . . . If a staff member is supervising three Ph.D. dissertations or three to six Master's theses, an attempt is made to give the staff member credit in his load for this supervision. This has not been formalized, however." – Lawrence M. Sommers

Montana State University: "The official policy pertaining to teaching loads at M.S.U. is that the normal load is 12 contact hours per week. . . . I have been successful, however, in giving each of the staff members other than myself one light quarter of eight or nine contact hours per week each school year." – Vincent K. Shaudys

Northwestern University: "Our teaching loads are essentially a departmental proposition. At the present moment each man teaches two courses per quarter, although once in a while an individual may have a third course in any given quarter. The contact hours in these two courses may run from 6 to 8 hours, depending on the course and whether there is a laboratory, etc.

"Our teaching loads, you see, are relatively light with the understanding that all of the staff is active in research at all times. Promotion only comes through research and publication." – Edward B. Espenshade, Jr.

Ohio State University: "Professors, 8 to 12 hours; Associate Professors, 8 to 13 hours; Assistant Professors, 10 to 15 hours; Instructors, 10 to 15 hours.

"Each regular member of the staff has the help of a graduate assistant in grading examination papers. Individuals may have one light quarter each year. In theory the chairman and others with heavy administrative duties have their loads reduced by three to five contact hours." – Guy-Harold Smith

Pennsylvania State University: "Our teaching load is 9 credits of contact hours per semester for associate professors and professors. Advising of theses is in addition to the 9 credits. For assistant professors the teaching load is 9 credits one semester and 12 credits the following semester. Summers are to be devoted to research, and working with advanced graduate students." – E. Willard Miller

Stanford University: "Professor C. Langdon White, 10 hours; Professor Paul E. Griffin. 10 hours; Assistant Professors Andrew F. Burghardt and John Thompson, 7 or 8 hours; Professor Joseph E. Williams, Executive Head, 7 or 8 hours.

"Approximately the equivalent of one three-unit course is allowed for administrative duties. No allowance is made for supervision of theses and dissertations; nor research." – Kaye Richmond, Secretary

Southern Illinois University: "We have a basic 'service load' of 12 hours a week, but any part of this may be assigned to research. In fact none of our staff members on continuing appointment teaches more than two courses (8-10 hours)." – Robert A. Harper

Southern Methodist University: "Our teaching load at S.M.U. is rather heavy. Everyone is supposed to teach 12 semester hours (12 lecture hours or the laboratory equivalent). Departmental Chairmen teach only 9 hours. . . . " – Edwin J. Foscue

State University of Iowa: "Teaching loads – normal, three courses, about eight hours, one course usually is a seminar; full professors (if productive) two courses, five or six hours, including one seminar, (ours are presumed to be productive); all multiple-section courses have their sections taught by teaching assistants." – Harold H. McCarty

University of British Columbia: "Our teaching load in Geography is fairly characteristic of other staff members and departments in the University, namely 9 to 12 contact lecturing hours per week. . . . Our aim is to reduce this teaching load to 9 hours per week (6 hours undergraduate and 3 hours graduate. . . .)." – J. Lewis Robinson

University of California (Berkeley): "On the question of teaching load, the standard load is three courses each semester, regardless of the number of 'contact hours.' Thus one is at a disadvantage if one has laboratory courses. But . . . next year I am scheduling, as closely as I can, three courses in one semester and two in the other for all. . . . If one has a load of administrative work or work on a committee . . . the load is reduced." – John B. Leighly

University of Chicago: "On the question of teaching load, it is impossible to give an accurate answer other than that 'it is arranged to meet individual abilities and needs.' A staff member may teach no course or 1, 2 or 3 courses according to his interests. Some carry their principal load in working with graduate students. Several of our major courses are joint ones in which several of us participate." – Gilbert F. White

University of Cincinnati: "In general the normal number of contact hours per staff member per week is between 9 and 12 hours. Each staff member is involved to some extent in the elementary courses . . . but this is not on a 'regular' basis since it requires only a few hours a semester. . . .

"My short answer is: between 8 and 12 hours for senior faculty (Associate Professor and up) and 10 to 14 for junior faculty, laboratory hours and field trips included." – Peter H. Nash

University of Colorado: "The College of Arts and Sciences at the University of Colorado recognizes a 9-10 credit hour teaching load as representing a normal load . . . there may be considerable variation or allowances for intensive research, chairmanships, etc." – Albert W. Smith

University of Georgia: "This institution works from a peak contact-hour load of fourteen to fifteen hours weekly. . . .

"When a faculty member formally asks for research time, spelling out thereby what he wants to do, and there are reasonable grounds to consider him of research capacity, then his teaching time is reduced to no more than ten contact-hours. . . .

"An administrative assignment at the departmental or divisional level within a college is considered one-third of a full load, e.g., equivalent to a five contact-hour course and a departmental chairman's load is reduced by that amount as standard." – Merle C. Prunty, Jr.

University of Illinois: ". . . I try not to have any member of the staff carry more than nine formal contact hours a week plus a seminar and one or two individual problem students. Only in very unusual situations will our teaching loads go higher than that and it may go considerably below." – Joseph A. Russell

University of Kansas: "Twelve hours of classroom teaching is considered a standard load here at the University of Kansas but no member of our staff in Geography has ever taught a load of more than nine hours. The usual load ranges from seven to nine hours. This assumes that approximately one-third to one-quarter time is devoted to research." – Walter M. Kollmorgen

University of Kentucky: "Our regular teaching load is twelve hours for staff mem-

bers and six to nine hours for department heads. . . .

"In theory, we make allowances for theses directed, seminars attended, and heavy committee work. But this does not work out in practice and the average staff member will teach twelve hours." – J.R. Schwendeman

University of Michigan: "Teaching loads are in general reasonable; a regular permanent member of the faculty carries three courses per semester, whatever the hours may be. No reduction is commonly made for research purposes because the load is calculated to allow for this. We are not overworked in teaching classes but are expected to show commendable scholarly output which is a most important element in appraising for promotion or salary increase." – Charles M. Davis

University of Minnesota: "Our average number of contact hours per week for regular staff members is eight. It is slightly less than that – probably about seven, for those staff members with major administrative and committee responsibilities." – John R. Borchert

University of Nebraska: "Generally, in the College of Arts and Sciences, in which this department is situated, the practice is that regular staff are expected to teach 12 hours per week. However, chairmen are permitted to make allowance for administrative assignments, committee work, supervision of theses and dissertations, and research. The result is that very commonly college staff at the level of full professor teach about 9 hours and chairmen often less than that." – Leslie Hewes

University of Oklahoma: "At the University of Oklahoma the standard teaching load for full-time faculty members is 12 contact hours per week. There are a few exceptions. An instructor, who would likely be handling two or more sections of the same course in a given semester, might be asked to teach up to fifteen hours. A number of so-called 'research professors,' who have done a considerable amount of distinguished writing, are authorized a teaching load of six hours per week." – Ralph E. Olson

University of Oregon: "Our teaching load is very simple. The normal load is now three courses or nine credit hours on the average. We make an allowance of three hours for the Department Head. No other allowances are made.

"This, by the way, represents a reduction from a twelve-hour average which we had two years ago." – Samuel N. Dicken

University of Pittsburgh: "A full load of the Academic Disciplines is defined as 12 hours, which usually means 12 contact hours. However, most senior people do not teach this often and I would say that an average load of 9 hours is characteristic of most departments. . . .

". . . . Deviations from the full load of 12 hours are based on administrative assignments, on research activities, and upon student advising." – Hibberd V.B. Kline, Jr.

University of Utah: "Teaching load is normally 12 quarter hours per week; 8-10 quarter hours if there are administrative duties; 8-10 quarter hours if there is considerable research carried on by faculty member concerned." – H. Bowman Hawkes

University of Washington: "The expression of faculty loads numerically is virtually impossible. Taking all factors, circumstances, and a wide range and variety of activities into account, I would estimate the normal load to be the equivalent of eight teaching classroom contact hours per week." – G. Donald Hudson

University of Wisconsin: "There is a general 'understanding' that each of us will accept responsibilities equivalent to ten class-contact hours. For those with substantial administrative burdens or extra loads of graduate advising, including dissertations, this is reduced a reasonable proportion. As a result, actual class contact-hours among the senior staff usually vary between six and nine hours a week, although instructors and assistant professors with less of the extra burdens mentioned above may be in front of classes for the full ten hours." – Andrew H. Clark

Wayne State University. "During the past academic year our regular teaching load has been established at nine hours (contact) per week for all staff above instructor and ten hours for the latter. This means, usually three courses, rarely four." – Fred E. Dohrs

Yale University: "The normal teaching

load at Yale calls for three courses. An undergraduate lecture course calls for three contact hours per week; a graduate lecture course or a seminar calls for two contact hours per week. A faculty member who offers undergraduate courses only would have nine contact hours; a member who is working with graduate students would have six contact hours.

"Allowance is made for administrative assignments. The chairman of the department may reduce his load by one course per semester." – Karl J. Pelzer

Conclusions. Teaching loads in universities and colleges that claim distinction as educational institutions should reflect the commitment to this important function. Ranking administrative officers concerned with education should give attention to salaries, teaching loads, productive research, and the service activities of the faculty. All of these faculty activities require examination continually in order that the morale of the teaching staff be maintained and enhanced.

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A LAWYER LOOKS AT THE NAME GEOGRAPHY

Wendell J. Brown

MacLeish, Spray, Price and Underwood, Chicago

HEREWITH is an item that I have prepared for the consideration of the geographic profession. As a nongeographer I must plead ignorance of most aspects of the field, but with my usual modesty I can see that there is a serious idea behind the spoof which might be of value to the profession.

A geographer takes a natural pride in his profession. It is a noble one, full of productivity and some leisure if the individual geographer can manage to wrangle it. But, surprisingly, the name geography does not appear to bother most geographers at all. They have a professional unawareness of the semantic effluvia which surrounds the images of the words geography and geographer in the minds of the nongeographic layman.

When one geographer meets another geographer they talk the same language. From my rather unique vantage point as a father-in-law of one of them, I am an expert on geographers. I don't know much about geography, *per se*, but I've heard geographers talk with each other. Observably, when they get together with their own kind there is a meeting of the minds. They advance rapidly in their discussions with such green lights of semantical transmutations as "Yes, I agree with that but don't you think . . . .," or "Yes I know but I have always thought that . . ." They get along fine, and I can tell that they are happy to have found each other. To paraphrase Shelley, "thought by thought is piled" till some great and invulnerable geographical truth is loosened. I'm proud to be related to one of them, even though only by marriage once removed. Their ability to articulate artfully and artlessly between themselves awes me no end.

Still, the semantical wonder to me is that geographers understand each other in spite of the inherent ambiguity in the name by which they identify themselves. Outsiders, such as most people are inclusive of myself, have been brought up to think that geography is a book, a rather large book with

more pictures than usual. We outsiders last saw that book when we were exposed to it and our fifth grade school teacher at the same time. Just for the record, my fifth grade school teacher was Miss Rose Sims. She was a tiny lady, a most efficient and dedicated person. For physical protection in the well disciplined childhood world that I remember, the geography book was just the right size; on occasion, the "jography" book could be inserted into the seat of one's pants. I don't remember that I ever did. But among my set it was a popular idea in those days, an idea that we played with but never put into action. It was a little too obvious to be practical. I could have used the book on occasion in the fourth or sixth grades, but not in the fifth. Miss Sims trusted us. She was a gentle soul. Never did she raise a hand against us either in anger or righteous indignation. But I should stick to my semantical gripe and not get diverted into my affection for her.

In spite of ourselves, we outsiders think of geography in terms of static description rather than as a science. It all goes back to that fifth grade geography book of our youth. For years I have thought, on those rare occasions that I have thought about geography at all, that it had to do solely with dry identification of the continents, oceans, countries, a few city capitals, mountains, prairies, and maybe a desert or two thrown into the totality of the staid descriptive picture. I felt that they were handy things to know about, but that my fifth grade geography book would tell me all there was to know about them did I but give it a chance.

Little did I suspect that geography was a science, i.e., the special arrangement of things in relation to the earth, once man had rearranged those things insofar as he could at a particular time and at a particular place.

Now that I know that geography is a science, I venture to think that it should have another name than the one which I, together with millions of others, have already assigned to a description of that which was contained in our elementary school textbooks. I appreciate that a dyed-in-the-wool geographer may not need a new name for his profession, to the end that another dyed-in-the-wool geographer can understand what he has to say either in theory, research, or practical application. For him, geography by any other name "would smell as sweet" and no semantical misnomer would fool him.

Nonetheless, the science which is encapsulated in the name geography is not solely for the intercommunicative use of geographers. That would be costly to geographers and laymen alike. Mark Twain had an island, an economic island, about which he wrote. On that island all the people who lived there took in washings for a living. The rumor is that the inhabitants had a lot of fun until they starved. They did get a lot of washings done, but from the economic viewpoint, which geographers will understand, there seemed to be something which wasn't quite kosher.

The observable fact is that we cannot all be geographers. Economically, there has to be a large number of outsiders. It is axiomatic that, even though most geographers are teachers or consultants, they have to persuade others at one budget time or another that their profession is not limited to the contents of a grade school geography textbook and yet is not too all inclusive. On such occasions, a new name might come in handy.

To that end, it would be better, I believe, not to have a name which has already been utilized and is in the public domain. Of course I could be wrong. After all, I did have a lot of respect for that elementary school geography book.

Suppose I am right. We could posit that bare possibility and not lose our scientific approach. If I am right, then someone within the clan of geographers will have to have a semantical inspiration. Maybe someone will have to create a name, preferably one with proper source in the Greek or Latin aristocracy of words.

There is a fair black and white periphery in the names political science, sociology, economics, geology, and mathematics, but I can perceive that the geographer after all these years might not be happy to label himself as one who can be identified under any of these titles. There is the strictly homemade name, ecosociobiogeographer, but I know better than to suggest a specific name and then advocate its adoption. I would like to see geographers obtain a new

name for themselves which would get human beings into it one away or another. Not just regions, but regions in action with human beings around. I sort of choke on ecosociobiogeographer. It is too much of a mouthful. I would rather stick to the name geographer unless someone can make a better suggestion.

Confucius said that, if he were given the power, the first thing he would do to supply the greatest need of his day would be to reform language. No one gave him the power, and 2,500 years later we suspect that he wouldn't have succeeded had he been given the sovereign power. Language isn't easily made by governmental edict. In our town, we still call Pulaski Road by its original name, Crawford Avenue, in spite of an ordinance to the contrary.

Whitehead, the philosopher, never hesitated to create new words, when he thought he should. He took the ordinary words misapprehension and apprehension, lopped off the misap and the ap, and had left the new word prehension. That process gave him a handy word to show the difference between perception and conception. Man sees and man reaches out to grasp. The latter is prehension. About 75 years ago, Thomas Huxley created the word agnostic and it has done pretty well. Each of these words is now in my *Webster's Collegiate Dictionary*, 5th edition. My beloved law school teacher, Dean Wigmore, dreamed up the term prophylactic rights to describe tort rights which in common law entitle a slightly wronged plaintiff to a judgment but only for a nominal sum. He borrowed the word prophylactic from medical science and there was no complaint from doctors. Lawyers didn't take to it too enthusiastically though, and it has more or less died on the vine.

Etymologically, the word geographer refers to an earth writer. I perceive that we can't lop off either geo or grapher and have enough left. The alternatives are to abandon the word entirely or add to it. Although the ideal of the geographer is to create an exact still life picture of a particular region at a particular time, I would like to see geographers figure out a name for themselves which would show their appreciation of the fact that the still life picture which they seek to show is of entities, human and otherwise, which are in the process of change. The procedure is to portray, not a static situation, but the process of change. The ability to use electricity is the ability to harness it with a dynamo, carry it with wires, and discharge it at the desired point of contact. The coined word dynageographer might accomplish what I have in mind. The term regional dynageographer might be a little nearer the right name. But I can see that I should stick to my resolve to stay out of it. New names are not that easy. Whenever self-esteem and the esteem of others is involved, there are indeterminate factors which require a cautious approach.

There is nothing new in this semantical fog in which geographers are immersed. From Houston's textbook, *Physical Geography*, which was published in 1888 "for use of schools, Academies, and Colleges," I quote this pronouncement:

> "Some authors have made physical geography a branch of geology, and have named it physiographic geology, but we prefer the word physical, or as the etymology would make it, natural geography."

There isn't much left for other scientists to do after Professor Houston outlines the periphery of his conception of geography. Listen for a moment to his textbook statement of what geography is:

> "Geography is a description of the earth . . .
>
> 1st. In its relations to the solar system.
>
> 2nd. In its relations to government and society.
>
> 3rd. In its relations to nature."

With this encompassment of geography, I can perceive that all that remains to be done is to fill in the details and we have the entire story of mankind in relation to his universe. From this all inclusive viewpoint, geography is all that is. All flora and fauna, with land, water, air, politics, and the solar system thrown in. We could, with Dr. Houston's statement, even throw in philosophy and religion and not crowd the concept of geography too much. "In the beginning God created Heaven and Earth," and that is Dr. Houston's geography provided it is broken down into his three

distinct branches, viz., mathematical, political, and physical.

I must be wrong about Dr. Houston's idea of geography. After all, in addition to his textbook on *Physical Geography,* he wrote three textbooks on Natural Science and two textbooks on Chemistry. I haven't read them, but he must have had quite a bit of the totality of his coherent culture to put into them.

Although this terminology of the Victorian age of geography must sound quaint to geographers today, it may furnish a clue. Maybe this all inclusive approach accounts for the current semantical mess. I doubt if it accounts for the fascination of geography to the modern geographer. Before he becomes dedicated he must have become fascinated with some specific area which was not all inclusive. Even though he doesn't feel tied down to any specific theory, method of research, or application, geography must be a part of science and not the whole of all that is. The geographer must do more than merely connect his work in one way or another with the earth. Even though every single thing is in some relation to every other single thing, the geographer perceives, I believe, that some systemization is handy.

Up to this point, I had thought that geography was a department of systematized knowledge and all that it needed was a better name. Maybe geographers will have to agree on what that department is before they hunt for a new name for it. I can see that advocacy of a new name will have to state its referents. The word region or its equivalent will have to be in it. Some such word must be selected which will show that geographers do not profess to bite off more than they can chew.

Now that I have established that there is a need for a new name for geography, a not flat-breasted name, I can see that there isn't much that I can do about it. I can see also that I will have to trust geographers to build their own fences and figure out their own new name. I do have two suggestions, maybe three.

My first suggestion is sneaky. One of the top-notch geographers or groups of geographers might pick a name for a slightly, very slightly, new approach to the systemization of geography. Ultimately and semantically this new name would replace the old, and geographers, instead of retaining their status as fossilized survivals of culture in the uneducated minds of nongeographers, would become part of the elite in the scientific world, only one step below nuclear physicists and basketball stars.

I have heard that the drunkard can give the most sincere and persuasive lecture on the evils of alcohol. With that in mind, I do not hesitate to give geographers the advantage of my second suggestion, most sincerely and persuasively. Don't throw into this potential new name any syllables that are not absolutely needed.

My third suggestion? Don't pick the name geography. Miss Sims owns that one.

THE STRUCTURE OF CONTEMPORARY AMERICAN GEOGRAPHIC RESEARCH*

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AMERICAN geographic research is undergoing constant change, and continual effort is necessary to adequately record its growth and development. This article attempts to make objective comments about schools of thought, leaders, and isolates, and to suggest possible avenues of further analysis. The work draws heavily on techniques developed in sociology and related fields dealing with similar problems in social and organizational situations. *(1)*

All articles, excluding memorials, in the *Annals of the Association of American Geographers, Geographical Review,* and *Economic Geography* published between January, 1958 and December, 1960, with the

exception of the December, 1960 *Annals*, were searched for references to other geographers. The term geographer was loosely defined to include borderline cases rather than exclude them. Jointly authored articles were treated as separate articles under each author. It was found that a total of 796 geographers were referred to by other geographers.

Following suggestive comments in Harary and Norman *(2)*, it was decided to define a school of geography as any set of authors with reflexive references. Figure 1 is a graph of the very few schools that emerged.

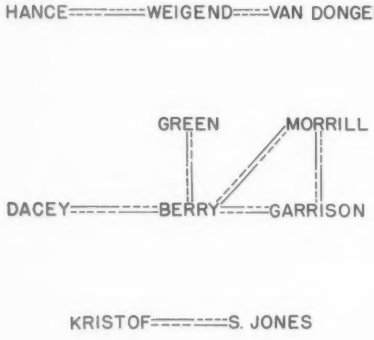

FIG. 1. Schools of geographic thought. Dotted end of line indicates "arrow head," or reference to an author.

In order to portray interconnections in more detail, each of the 86 most referred to geographers was given a number (Table 1) and the relationships among the 86 were set in a matrix (Fig. 2). These 86 were the geographers to whom four or more references were made. Notice the prominence of the unsymmetrical *(3)* major diagonal, which represents self references. Figure 3 reproduces the matrix in another graphic form, omitting self references. The graph was constructed on the principle that the total length of all the lines be minimized as well as can be accomplished with visual trial and error methods. One curious fact emerges *(4)*, that by attempting line-length minimization, the geographic map of the country is roughly reproduced in Figure 3. For instance, Ullman appears on one side, S.B. Jones on the other, and McCarty in the middle. The two coasts and the middle of the country are thus roughly outlined. Of course, the orientation of the graph was selected to emphasize geographic correspondence. This "tyranny of distance" ap-

TABLE 1

KEY TO 86 MOST REFERRED TO GEOGRAPHERS

1. Alexander, J.	44. Losch, A.
2. Baranski, N.	45. Lowenthal, D.
3. Beckmann, M.	46. McCarty, H.
4. Berry, B.	47. McCourt, D.
5. Bracey, H.	48. Marble, D.
6. Brush, J.	49. Marts, M.
7. Carol, H.	50. Melamid, A.
8. Casas Torres, J.	51. Morrill, R.
9. Christaller, W.	52. Murphy, R.
10. Cressey, G.	53. Nystuen, J.
11. Davis, W.	54. Patton, D.
12. De Geer, S.	55. Philbrick, A.
13. Dickinson, R.	56. Phipponeau, M.
14. Dury, G.	57. Platt, R.
15. East, W.	58. Pounds, N.
16. Evans, F.	59. Robinson, A.
17. Federov, E.	60. Sauer, C.
18. Fenneman, N.	61. Shabad, T.
19. Finch, V.	62. Sloane, E.
20. Fisher, C.	63. Smailes, A.
21. Freeman, O.	64. Spate, O.
22. Garrison, W.	65. Sprout, H.
23. Gerasimov, I.	66. Spykman, M.
24. Godlund, S.	67. Stamp, L.
25. Gottman, J.	68. Steffanson, V.
26. Green, F.	69. Stewart, J.
27. Griffin, P.	70. Strahler, A.
28. Grigor'ev, A.	71. Taylor, G.
29. Hance, W.	72. Thompson, J.
30. Harris, C.	73. Thornthwaite, C.
31. Hartshorne, R.	74. Trewartha, G.
32. Haushofer, K.	75. Ullman, E.
33. Hettner, A.	76. Van Dongen, I.
34. Hook, J.	77. Vance, J.
35. Isard, W.	78. Von Humboldt, A.
36. James, P.	79. Wallace, W.
37. Jones, C.	80. Warntz, W.
38. Jones, S.	81. Weigand, G.
39. Karan, P.	82. Weigert, H.
40. King, L.	83. Whittlesey, D.
41. Knos, D.	84. Williams, R.
42. Kollmorgen, W.	85. Wright, A.
43. Lattimore, O.	86. Zimmerman, E.

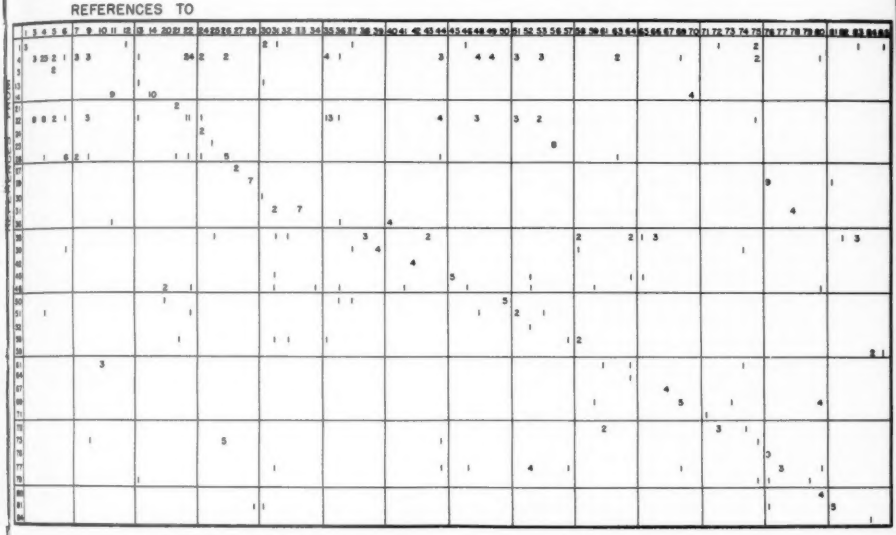

FIG. 2. Matrix of references between 86 most referred to geographers.

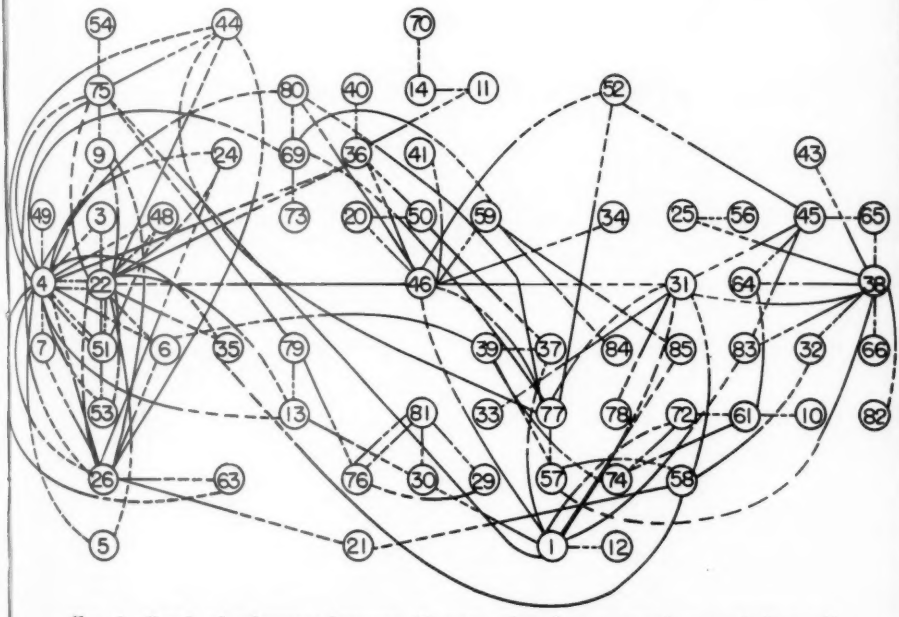

FIG. 3. Graph of references between 86 most referred to geographers, excluding self references. Dotted end of line indicates "arrow head," or reference to an author.

pearing in the local exchange of ideas is in absolute conformance with the work of the Swedish geographer, Hagerstrand *(5)*, on this subject.

The graph is highly suggestive in other ways. For instance, certain research workers hold divergent groups together and these workers have long lines running to them. Some connect the profession by being referred to while others provide cement by their references to others. By cutting certain prominent lines, the graph would fall into different major parts. Thus, these connections act as bridges. The reader will find more information in the graph.

Certain measures of leadership immediately suggest themselves. If leadership is defined as the total number of references received (perhaps several votes from one individual), the top 20 men in contemporary American geography are shown in Table II. Figure 4 shows rank-size relationships. If

TABLE II

RANK OF GEOGRAPHERS BY TOTAL NUMBER OF REFERENCES RECEIVED

Rank	*Geographer*	*References*
1	Garrison, William	40
2	Berry, Brian	34
3	Hartshorne, Richard	23
4	Isard, Walter	22
5	Harris, Chauncy	21
6	Ullman, Edward	21
7	Van Dongen, Irene	21
8	Murphy, Raymond	18
9	Brush, John	14
10	Davis, W.M.	14
11	Green, F.H.W.	13
12	McCarty, H.H.	13
13	Dickinson, Robert	13
14	Losch, August	12
15	Beckmann, Martin	11
16	James, Preston	11
17	Trewartha, Glenn	11
18	Vance, James	11
19	Whittlesey, Derwent	11
20	Dury, G.H.	10

leadership is defined as the total number of *different* geographers who refer to a geographer (i.e., one indivdual can only vote once for another individual), then the top 21 men are shown in Table III.

Isolates can be defined in various ways. Some isolates are those who refer to other

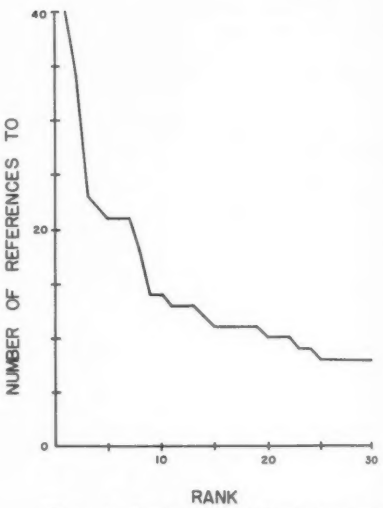

FIG. 4. Rank-size relationships; total number of references received.

geographers but are not referred to in turn. Other isolates are referred to by other geographers but in turn only refer to themselves

TABLE III

RANK OF GEOGRAPHERS BY NUMBER OF REFERENCES RECEIVED FROM DIFFERENT GEOGRAPHERS

Rank	*Geographer*	*References*
1	Hartshorne, Richard	17
2	Harris, Chauncy	14
3	Ullman, Edward	14
4	McCarty, H.H.	12
5	Dickinson, Robert	11
6	James, Preston	11
7	Murphy, Raymond	10
8	Trewartha, Glenn	10
9	Brush, John	9
10	Whittlesey, Derwent	9
11	Garrison, William	7
12	Isard, Walter	7
13	Losch, August	7
14	Spate, O.H.K.	7
15	Sauer, Carl	7
16	Jones, C.F.	6
17	Platt, Robert	6
18	Pounds, N.J.G.	6
19	Robinson, Arthur	6
20	Thompson, John	6
21	Warntz, William	6

or to nongeographers. Still others are totally isolated from other geographers since they refer to and are referred to either not at all, or to themselves, or to nongeographers, or some combination of these three. Figure 2, which only includes geographers with four or more references so that none are truly isolated, does indicate three types of isolation among the top 86. If a number is missing in the References From axis, this means there were no references from that individual to any other and he is "isolated from." Similarly, others are "isolated to" and "totally isolated."

The matrix and graphic tools to study the structure of our profession can be broadened in their application. For instance, if the expanded version of the matrix in Figure 2 is squared, every place a number appears in the squared matrix means that the researchers in the row and column the number relates are connected through some third author. Numbers in a cubed matrix relate researchers two steps away, and so forth. Another direction the investigation might take is to apply one of the different measures of the internal cohesiveness, or connectivity, to the matrix in Figure 2. Obviously, comparisons to past geographic structure and to structure in other fields of knowledge can be made.

* * *

(*) Mr. Harold McConnell of the State University of Iowa must be given credit for the preparation of all data and the drawing of all figures.

(1) Harary, Frank and Norman, R.Z., *Graph Theory as a Mathematical Model in Social Science*, University of Michigan, Institute of Social Research, Ann Arbor, 1953.

(2) *Ibid.*

(3) In order to conserve space all column and row vectors equal to zero were omitted, making matrix entries slightly unsymmetric.

(4) Brought to my attention by Mr. Donald Blome of the State University of Iowa.

(5) Torsten Hagerstrand, *Innovationsforloppet Ur Korologisk Synpunkt*, Gleerupska University Bokhandeln, Lund, 1953.

SOME PHOTOGRAPHIC TECHNIQUES FOR GEOGRAPHERS

Simon Baker

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The simplest 35 mm or twin lens reflex cameras have potentials which are seldom utilized by the average owner. Teachers and researchers have been quick to make good use of such cameras with color film for producing illustrative slides; however, it is the purpose of this article to suggest some techniques which will expand the use of these cameras beyond the making of ordinary black and white pictures or color slides. The small camera is a valuable tool which can help the geographer in the classroom and library as well as in the field.

Telephoto effect. Most cameras presently in circulation are of the low or medium priced varieties and do not have the expensive feature of lens interchangeability. Yet, owners often have need of telephoto or wide-angle effects in their photographs. These can be achieved if the cameras are properly utilized.

Extreme enlargement of a portion of a black and white negative is a satisfactory substitute for the telephoto lens; but, in order to successfully enlarge the small negative, it is necessary to obtain as sharp an image as possible. This is accomplished when careful attention is paid to routine picture taking procedures. The highest shutter speed available should be used to counteract hand-shake and avoid blurring the image on the film. If slow shutter speeds must be used, a tripod and cable release will ensure steadiness. Care in focusing should also become part of the picture taking routine. Some films are capable of producing sharper images than others,

and these should be used. Kodak Panatomic-X is one of the so-called slow, thin emulsion films which produce sharp images capable of great enlargement.

Wide-angle effect. In making wide-angle photographs, any type of black and white film may be used. If the scene to be photographed cannot be encompassed on one frame, the photographer should visually divide the scene into two or more equal parts while looking through the camera viewfinder. Standing in one place, the photographer then makes a separate photograph of each part of the scene, allowing for a reasonable amount of overlap between photographs (Fig. 1). The finished photographs are matched up and mounted on a backing after superfluous overlap between them has been trimmed off.

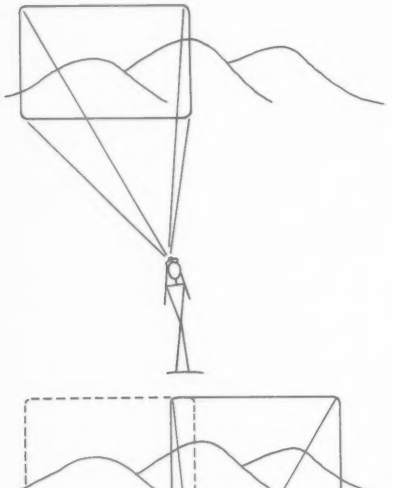

FIG. 1

A wide scene composed of two photographs can easily be taken when the camera is hand held. In order to take three or more adjoining photographs, the camera should be mounted on a tripod with a pan head. Some camera manufacturers, such as the maker of the Rolleis, sell accessories which can be mounted on tripods and make it possible to take a series of adjoining photographs covering an angle of up to 360°.

Stereoscopic effect. Occasionally, the geographer may find himself confronted by a particular view which he feels should be seen in three dimensions. If he has a stereoscopic camera he may photograph the scene in color and later show it in a special viewing device. He can also use black and white film and view the enlarged pair of prints under a pocket stereoscope of the type used in aerial photo interpretation. Pairs of photographs taken on the ground or in the air in this fashion may be printed in publications for examination by readers using pocket stereoscopes.

The geographer, however, may be traveling light and have with him only an ordinary 35 mm or twin lens reflex camera when he desires to make a three dimensional view. If the scene to be photographed is a static one, or one without much movement in it, he may utilize his ordinary camera to make a stereo-pair of photographs which, when examined under a pocket stereoscope, will show the scene in depth. This is accomplished by making two separate photographs of the same view, taking each from a position one sideward pace apart (Fig. 2). In other words, the photographer frames and shoots the view, then advances the film, steps one pace to the right or left, and tries to frame and shoot the scene the second time exactly as he did the first time. This will produce a pair of prints which may not be exactly alike but will be sufficiently similar so that at least most of the central portions will appear three dimensional under a pocket stereoscope.

One camera to do the work of two. The geographer in the field often wishes to record scenes both in the form of slides for projection, and as black and white prints for publication. The usual solution to this problem is to carry two cameras, one loaded with color film for slides and the other

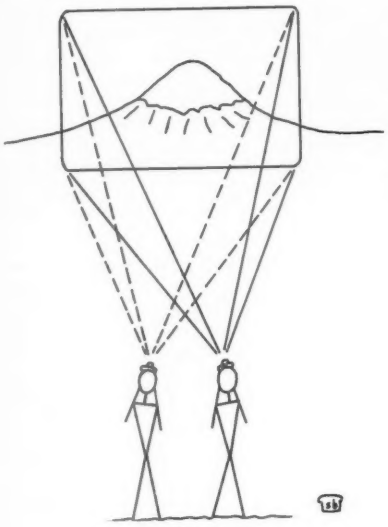

FIG. 2

with black and white film for prints. However, for a variety of reasons, it may not be practical to carry two cameras.

There are several possibilities open to the one-camera photographer which will allow him to produce, simultaneously, the film image for both slide and print. The first, and least expensive, alternative is to load the camera with black and white film. Prints can be made from the negatives as usual, and black and white projection positive slides can be made from the same negatives. The latter type of service is not ordinarily provided by local film finishers, but an examination of advertising in almost any photography magazine will disclose names of mail-order photo-finishers who do this sort of work. The second alternative is to load the camera with a color negative film such as Kodacolor. The usual end product when using this film is a set of color prints on paper, along with the color negatives. However, prints need not be made if they are not desired. From the color negatives, black and white instead of color prints can also be made, or the usual type of color slides for projection can also be made. Again, if this service is not available locally, there are mail-order photo-finishers who can do the job.

Close-up photography. Most 35 mm and twin lens reflex cameras will focus on subjects anywhere between infinity and two or three feet. The unaided camera lens is usually incapable of taking a clear picture of a subject at a closer distance. It is in this close-up zone, however, that the geographer can do some of his most useful photography. How, then, can this distance barrier be overcome?

The solution is to use close-up, or so-called Plus lenses, which extend forward the range of focus and work on everything from the simple box camera to the most refined and complicated mechanism costing hundreds of dollars. Close-up lenses are single pieces of glass which are mounted in front of the camera lens in the same fashion as filters. They come in varying strengths, from Plus 1 diopter to Plus 10 diopters. The larger the Plus value of the lens, the closer the camera using it can approach the subject. Such lenses are additive in effect; that is, a Plus 1 and a Plus 2, when mounted in a double retaining ring in front of the camera lens, will equal in effect the value of a single Plus 3 lens.

The accompanying Table, abstracted from the *Tiffen Filter Manual (1),* indicates how Plus lenses can alter the range of focus of a 50 mm focal length lens on an ordinary 35 mm camera. The reader will note that only Plus lenses of the lowest and highest values have been used as illustrations; there are also available a large number of intermediate sizes of fields and focal distances using close-up lenses of intermediate values. Accurate subject-to-lens measurements are necessary when using close-up lenses in order to obtain best results; therefore, a tripod or other device like a copying stand, which holds the camera firmly in position, is necessary.

With a little experimentation and expenditure of film and time, the geographer should soon master the intricacies of working with close-up lenses. When this has been accomplished, all sorts of uses for this tool will suggest themselves. Below are described some uses for close-up photography which the author has found helpful in his work in the classroom and while conducting research.

Map slides in color. Topographic maps are used in many kinds of courses. The usu-

TABLE

EFFECT OF CLOSE-UP LENSES ON FOCUS AND FIELD COVERAGE OF A 35mm CAMERA WITH A 50mm LENS

Close-Up Lens (Diopters)	*Footage Setting on Camera*	*Inches From Subject to Lens*	*Field Covered (Inches) on the 24 x 36 mm Negative*
+1	Infinity	38⅜	18⅝ x 28
	3½	20⅝	9¼ x 14
+2	Infinity	19½	9⅜ x 14
	3½	13⅜	6⅛ x 9¼
+10	Infinity	4¼	1⅞ x 2¾
	4	4	1⅝ x 2½

al procedure is to distribute to members of the class copies of the map to be discussed. However, in a large class the instructor cannot be sure that students are all looking at the exact portion of the map being discussed. If the instructor has previously made a close-up slide of each point of interest on the study map, he can project a much enlarged image onto the screen and be sure that students are seeing exactly that part of the map under discussion.

Making a color close-up slide is simple. The map is laid out on a flat surface near a large window, and a meter reading is taken by pointing the exposure meter straight down at the map just the way the camera will be pointed. The camera is set up with the proper close-up lens attached, and measurements are made between the map and lens to insure correct focus. If a long exposure is called for, as will often be the case using some of the slower color films, a cable release should be used on the camera. It should be noted that, when such a map slide is shown in series with a slide of the actual feature taken from the ground or air, a much more effective impression is made on the audience.

Map slides in black and white. The best and most up-to-date maps on many subjects often appear in current literature. An example would be the latest political map of Africa. Wall maps and atlas maps on this subject are mostly quite out of date.

The geographer can make a close-up of a printed page or portion of a page and thus can copy the most recent map on black and white film. For this purpose he should use a special copy film, such as Kodak Microfile, if it can be purchased. If no Microfile is at hand, he may use Kodak Panatomic-X or Plus-X Pan, either of which is readily available. When using these latter films he should expose them at twice the recommended A.S.A. speed rating. The film should then be overdeveloped by about 15 per cent of the recommended time, which will result in a negative of great contrast with strong blacks and whites. At this point, a positive slide can be made from the negative; but it is not necessary to do this. Instead, the negative itself may be mounted in a standard 2" x 2" metal or plastic and glass frame and projected. The result will be the reverse of the original printed map, since there will be white lines and patterns on a black background, but this usually makes the map no less readable.

Another quick method for making black and white slides is to use color film. The whites may have a slight yellowish tinge, but the maps project well and the mounted positive slides are returned from the photofinisher to the photographer with a minimum of work on his part.

Maps for theses and dissertations. Professional map reproduction is expensive. If several reproductions of page-size maps are necessary to illustrate a paper, the same

method may be used as that outlined above for making black and white slides using black and white film. The only difference is that the negatives, instead of being mounted for projection purposes, should be enlarged to the necessary size and printed on a high contrast paper. Any number of prints may be made and mounted in copies of the thesis or dissertation. With care and attention, acceptable prints may be made by this method.

Photographic note taking. Whenever the author is conducting library research, he carries his Pentax 35 mm single lens reflex loaded with black and white film, several close-up lenses, and an exposure meter. If a particularly useful article is encountered and time is short, the entire paper may be copied on one or several rolls of film. The publication is laid flat on a table near a window, a meter reading is taken, the proper close-up lens is attached, and the article is photographed page by page. From the resulting negative strip, page-size enlargements may be made, or the strip itself may be run through a standard microfilm reading machine of the type found in most libraries. Thus, research time is saved, and otherwise unattainable articles are recorded and stored on compact strips of 35 mm film for use when required.

Some miscellaneous suggestions. If the geographer finds that he has need for large quantities of black and white film, he should purchase bulk film in order to reduce the unit cost. Kodak and other manufacturers produce a variety of black and white films in lengths of 27½, 50, and 100 feet. There are daylight bulk film loaders available for loading 20 and 36 exposure lengths into empty 35 mm cartridges.

Maps and diagrams larger than page size can be copied in color or black and white without using close-up lenses. If the entire map can be framed in the camera's view finder, and if the map is not closer to the camera than the lowest footage setting on the lens, the photograph can be made successfully. The author has made copies of a number of wall maps in this fashion and uses these slides when lecturing in places which have no large maps.

The author has found that the most useful type of 35 mm camera for the purposes discussed in this article, and for general photography as well, is the single lens reflex with prism viewfinder. The nature of the design of this camera, in which viewing is done through the camera lens itself, greatly simplifies close-up work. There is no problem of parallax and, when a close-up lens is attached, the camera can be visually focused by the photographer. This does away with the need for intricate measurements and copying stands. If fast film is used and the light is good, quick copy work is possible merely by hand-holding the camera.

* * *

(1) Tiffen Filter Manual, Tiffen Optical Co., Roslyn Heights, L.I., N.Y., 1959.

WHERE SHALL I GO FOR THE PH.D.?*

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ONE QUESTION is often heard from geography majors in those colleges and universities where geography instruction is not carried beyond the M.A. degree: "Where should I go for the advanced degree?" When faced with the question, most faculty advisors base their reply on subjective judgments, personal experience, and professional contacts.

For the student who wishes to continue work in a certain branch of geography, however, it is desirable to know which universities are equipped to meet this particular need. To some extent this can be determined by scanning the published works of geography faculties, course offerings in university catalogs, papers presented during meetings of the Association, and in other ways. This brief survey is concerned with the first of the methods, namely, analysis

of published works of the geography faculties of 17 universities. Lists of published articles were supplied by the departments themselves; in addition, titles were obtained from the standard American professional publications in the field of geography, and lists of theses published in *The Professional Geographer* and elsewhere. Listing was as complete as possible, with nearly 1,500 titles in systematic geography and over 900 titles in regional geography.

The tabulations resulting from the study cannot represent *all* published works, but they are sufficiently comprehensive to support the conclusions stated herein. In classifying titles, some subjective judgment was used. There was some duplication in the listing; for example, the title "Salt Lake City: A Regional Capital" was classified under the regional heading U.S.A. as well as the systematic heading Urban. Listings did not include book reviews, minor published items, or material in Social Science yearbooks and in edited volumes such as those by Garland or Freeman and Morris.

Systematic studies are classified in Table I. Economic geography is by far the most important single subject occupying research interests of staff members of the universities which were studied. It is particularly emphasized at The Pennsylvania State University, and somewhat less so at the University of Nebraska and the University of Illinois. Cultural geography, including urban studies, is a major interest at the universities of Nebraska, Illinois, Louisiana, Syracuse, and Wisconsin. Louisiana, Clark, and California at Berkeley place more than usual emphasis on geomorphology. California at Berkeley is the only institution with a noticeable concentration of publications in historical geography; and Clark and Indiana universities are especially interested in the teaching of geography. Wisconsin

TABLE I

PUBLISHED CONTRIBUTIONS TO SYSTEMATIC GEOGRAPHICAL KNOWLEDGE AS A PERCENTAGE OF TOTAL PUBLICATIONS FROM EACH DEPARTMENT

Department	*Mathematical and Cartography*	*Landforms*	*Weather and Climate*	*Economic*	*Political*	*Cultural and Urban*	*Historical*	*Teaching*
California (Berkeley)	....	14	....	27	....	....	17	....
California (Los Angeles)	....	....	....	24	....	....	....	....
Chicago	....	....	....	31	....	....	....	....
Clark	....	19	....	29	....	....	....	13
Illinois	....	....	....	34	....	24	....	....
Indiana	....	....	28	24	....	8	....	8
Louisiana	....	30	17	....	....	22	....	....
Maryland	....	....	....	25	....	....	....	....
Michigan	....	....	....	28	....	....	....	....
Nebraska	....	....	....	37	....	30	....	....
Northwestern	....	....	....	23	....	....	....	....
Ohio State	....	....	....	23	....	....	....	....
Pennsylvania State	....	....	....	58	....	....	....	....
Syracuse	....	....	....	19	....	21	....	....
Washington	....	....	....	26	....	....	....	....
Wisconsin	19	....	....	20	17	12	....	....

leads in cartographic studies; and Indiana and Louisiana in meteorology and climatology (numerous weather studies by S.S. Visher at Indiana account for much of this emphasis).

For the student less interested in specialization than in a more rounded program, geography is covered most comprehensively at California at Berkeley and Los Angeles, although the former has not specialized in political geography or aspects of teaching. Publications in wide variety have also come from Chicago although, despite the influence of J. Paul Goode in the field of cartography, that subject does not appear frequently in the lists. The staff at Clark University has also published widely but not in the field of historical geography. Other institutions that are widely productive in the systematic aspects of the subject include Indiana, Northwestern, Ohio State, Washington, and Wisconsin.

Some universities have been outstanding in the production of geography texts. Among these are California at Los Angeles, Clark, Syracuse, Wisconsin, and Indiana.

The regional distribution of research published by different university faculties is shown in Table II. It is to be expected that published research from the 17 universities deals mainly with areas within the United States. This is particularly true at Louisiana, Ohio State, Nebraska, Washington, Pennsylvania State, Illinois, and California at Berkeley. There is much less emphasis on United States geography at Syracuse, Texas, Chicago, and Michigan. In all 17 universities, staff publications on United States subjects on the average were 44 per cent of the total.

Publications in the field of South American geography are particularly emphasized at Syracuse, Illinois, Northwestern, and Chicago, whereas Mexico and the Caribbean are stressed at California (Berkeley) and Chicago. Western Europe is a special field of interest at Texas, Indiana, Syracuse, and Clark. Eastern Asia is an area of major attention at Michigan, Wisconsin, Texas, Pennsylvania State, California at Los Angeles, and Clark. U.C.L.A. is the only institution with any number of publications

TABLE II

PUBLISHED CONTRIBUTIONS TO REGIONAL GEOGRAPHICAL KNOWLEDGE AS A PERCENTAGE OF TOTAL PUBLICATIONS FROM EACH DEPARTMENT

Department	*U.S.A.*	*Mexico and Caribbean*	*South America*	*North America*	*Western Europe*	*Eastern Asia*	*Australia and N. Zealand*
California (Berkeley)	54	25	7	....	....	....	....
California (Los Angeles)	43	....	....	....	....	21	8
Chicago	28	21	15	....	....	....	....
Clark	41	....	....	....	18	17	....
Illinois	57	....	21	....	....	....	....
Indiana	53	....	....	....	31	....	....
Louisiana	91	....	7	....	....	....	....
Michigan	29	....	....	....	....	33	....
Nebraska	70	....	....	....	....	....	....
Northwestern	43	....	19	....	....	....	....
Ohio State	71	....	....	....	....	....	....
Pennsylvania State	58	....	....	....	....	21	....
Syracuse	....	....	36	....	21	16	....
Texas	....	....	....	....	54	22	....
Washington	61	....	....	....	....	....	....
Wisconsin	41	....	....	....	....	23	....

dealing with Australia and New Zealand. Several universities seem particularly well rounded in the publication of regional studies by the faculties, especially California at Los Angeles, Clark, Northwestern, Indiana, Pennsylvania State, and Wisconsin. U.C.L.A. staff members have published articles on every major world area with the exception of the polar regions and Oceania. Clark staff members have not dealt with the geography of South America, the Soviet Union, Central Europe, or Africa.

Finally, one might assume that the total number of publications from a department indicates the degree of development of research activity. As a matter of fact, the length of time during which the various departments have been operating may be the governing factor rather than research interests of different faculties. Further, the size of the department is a consideration that should be taken into account. U.C.L.A., particularly because of the size of its staff, has been most prolific in publishing, followed by Indiana, Wisconsin, California at Berkeley, Louisiana, Northwestern, and Syracuse.

* * *

(*) In this compilation I have had the assistance of David Andrick, Terence Burley, and Julius Hanuska, and I am indebted to the departmental chairmen who responded to requests for lists of publications.

ANNUAL MEETING
of the
ASSOCIATION
OF
AMERICAN GEOGRAPHERS

East Lansing, Michigan
Aug. 28 - Sept. 1, 1961

ASSOCIATION AFFAIRS

ADDRESS CHANGES FOR ASSOCIATION MEMBERS AND ADDRESSES OF NEW MEMBERS

The following list of address changes for members of the Association of American Geographers, and addresses of new members of the organization, has been prepared by the Editors from data supplied by Central Office personnel of the Association. The list updates membership and address information contained in the 1961 edition of the *Handbook-Directory*. It is the plan of the Editors to include a similar annual list in each May issue of *The Professional Geographer*.

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ANNOUNCEMENTS AND REPORTS

RESEARCH AT THE CHILEAN INSTITUTE OF GEOGRAPHY

The Instituto de Geografia of the Universidad de Chile is making important contributions to geography in Latin America. American geographers who visited Chile as recently as five or six years ago would scarcely recognize the organization today. It has acquired new status, vigor, and personnel.

The Instituto was founded well over a decade ago under the able direction of Professor Humberto Fuenzalida. Until 1954, it was a part-time research organization affiliated with the teachers' college (Instituto Pedagogico) of the University. In 1954, the Instituto was established as a full-time research association. As such, it is unusual in the Americas; its members participate in no formal teaching activities except to offer specialized courses for professional geographers when specific needs arise. Its present staff is young, ambitious, well trained, and serious of purpose. Their research aims are, broadly speaking, to investigate the geography of Chile on a highly professional level.

The Instituto occupies two buildings in the suburb of Nunoa, in southeastern Santiago. One building houses offices, libraries, a cartographic laboratory, and part of a geochemical laboratory. The other building contains a garage, storage area, and a laboratory for geomorphological, sedimentological, and geochemical studies. Geographical research is conducted in four fields: physical, human and historical, biological, and regional and planning.

The Director, Professor Jean Borde, has set high standards for the personnel of the Instituto. He is currently conducting studies in the physical geography of an Andean section of the Maipo watershed near Santiago. Some of his geomorphological work has been published in France and Chile.

Research projects undertaken by the various sections of the Instituto may be of interest to geographers in this country. The Section of Physical Geography, headed by Srs. Reynaldo Borgel and Romulo Santana, is making important contributions to knowledge of Chilean geomorphology. It is the only continuously active earth science research unit in Chile. Sr. Borgel recently completed a study of sedimentation in the watershed of the Rio Maule and its influence on the Port of Constitucion. He is currently occupied with a pilot research project in the Norte Chico region. One aspect of this work is to map geomorphological features along the Chilean littoral, between Rio Elqui and Rio Anconcagua; the other aspect is to study the small valley of the Rio Turbio, in the upper Elqui watershed. Sr. Santana is concluding a study of glacial and volcanic features in the Rios Cachapoal, Tinguiririca, and Teno basins, approximately 200 km. south of Santiago.

The Section of Human and Historical Geography is composed of Professor Mario Gongora, Asesor de Historia, and Sr. Pedro Cunill, Chief of Research. The Section has directed much of its attention to documentary studies in national and parochial archives and in certain private collections. It has been particularly interested in attributes of Chilean geography during the 18th century, including the political, demographic, agricultural, mineral, transportation, and occupance features of the period.

The Section of Regional Geography and Planning has been reactivated, after a short period of inactivity, under the direction of Sr. Sergio Sepulveda, who also serves as editor of the Instituto's review, *Informaciones Geograficas*. Current research involves the mapping of land utilization in Central Chile, employing technical assistants for field work. The IGU land-use classification has been adopted. Data are obtained by a combination of large-scale field mapping and air-photo interpretation. The initial objective is a survey of the area between the Aconcagua and Laja valleys; this will be first in a series of regional studies throughout Chile.

The Section of Biogeography is headed by Sr. Rafael Baraona, Assistant Director, who is on leave this year as regional specialist for CEPAL (United Nations) in Bolivia. The section has recently completed a detailed study of small farms and crop systems of the Putaendo Valley, a northern tributary of the Aconcagua. It is now investigating, in collaboration with the Ministerio de Agricultura and the Estacion Experimental Agronomica of the Universidad de Chile, types of corn grown in Chile to determine their characteristics by sampling, to locate each geographically, and to examine their ecological, cultural, and genetic relationships.

Occasionally, special requests are made for services of geographers at the Instituto. During the period of devastating earthquakes last year in southern Chile, the organization was one of the official scientific agencies that participated in assessing and analyzing seismic damages. A team of specialists headed by Professor Borde, and including Srs. Borgel and Santana and the author, reported on various aspects of the resulting damage, including the extensive landslides which blocked the Rio San Pedro and threatened the City of Valdivia with floods.

Among important facilities available to the research staff are the geochemical laboratory, under the supervision of Sr. William Donoso; the Section of Cartography and Drafting, headed by Sra. Amparo Iranzo; the map library, supervised by Sra. Graciela Uribe de Borizon; and the reference library, directed by Sra. Eugenia Labbe de Aldunate. Ultimately, the Instituto hopes to house the largest and most complete collection of maps of Chile. It now has thousands of cadastral maps from the Direccion de Tierras, all of the topographic maps published by the Instituto Geografico Militar, many old originals of historical value, and ozalid copies of census maps.

American geographers will be interested in *Informaciones Geograficas*. The periodical contains a topical bibliography of geographical literature published in Chile each year, and lists of foreign publications about Chile. Also included are geographical monographs and *memorias*, as well as lists of maps published by the Instituto Geografico Militar and the Departmento de Navigacion e Hidrografia de la Armada Nacional.

The Instituto is interested in establishing exchanges of publications with American geographical institutions. Visiting geographers receive courteous and generous attention from the staff. Personnel may be contacted at: Instituto de Geografia, Universidad de Chile, Facultad de Filosofia y Educacion, Jose Pedro Alessandri 1027, Casilla 147, Santiago, Chile.

Donald D. MacPhail
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NOTES ON FLORIDA'S TEN THOUSAND ISLANDS

From time to time, letters have been received by the writer from geographers inquiring about Florida's Ten Thousand Islands. With the idea that others might be similarly interested, the following brief report was prepared.

Along Florida's southern Gulf coast, for some 100 miles between Cape Romano to the north and Cape Sable to the south, is located a two- to eight-mile-wide island maze unique to the North American continent. The thousands of mangrove and shell islands, ranging in size from a few square feet to many square miles, are collectively known as the Ten Thousand Islands. Today, most of the islands are unpopulated, relatively unknown, and infrequently visited. Centuries ago, however, much of the region, together with the so-called Big Cypress section farther inland, was inhabited by Indian tribes. Most of these have long since disappeared. and the few remaining Seminoles are not located on the Ten Thousand Islands.

During and following withdrawal of the Indians in the early 19th century, the islands underwent a period of rather intensive, largely exploitive, development by whites. Lumbering, commercial fishing, and agriculture occupied several hundred more or less permanent residents during the last 75 years of the century. Most of

the higher lands were cleared and used for plantation agriculture. Coconuts, guavas, mangoes, citrus, and other tropical and subtropical fruits were cultivated widely. In addition, such staples as cabbages, tomatoes, and corn were produced and transported to Key West, Cuba, and northern mainland Florida. The islands were unconnected with the outside world except by boat and primitive swamp trails, and hence an isolated, essentially independent culture developed. To some extent, this characteristic persists today.

With the turn of the century, large-scale settlement began in southern mainland Florida. This was followed by the spectacular opening up of the southern Atlantic coastal section, and agricultural development of the Okeechobee and Everglades mucklands. However, the Ten Thousand Islands were mostly by-passed in this era; they remain today as Florida's last frontier.

The interesting nature of the islands' cultural aspects is exceeded by that of their physical make-up. The islands are mostly irregular in shape, being indented by numerous inlets and bays. Shallow lagoons, tidal creeks, and rivers separate the islands from one another and from the mainland. Probably 75 per cent of the islands are of mangrove origin, the dominant mangrove species being the red (*Rhizophora mangle*), black or honey (*Avicennia nitida*), and white or white buttonwood (*Languncularia racemosa*). However, the outermost portion of the group consists of higher, drier, and older islands that obviously are of different origin. Plant and animal life is unusually varied on these older shell islands; they support more than 850 different types of plants, including 125 kinds of small trees and shrubs. Animal and fish life are equally diverse.

It appears that a primary factor in development of the myriad mangrove and shell islands off southwestern Florida is the decreased wave and current action in the shallow and stagnant waters of the broad embayment between the two previously mentioned terminal capes. In addition, salinity and turbidity conditions seem to be ideally suited to maximum development of oyster and clam beds, which are exposed at low tide and thus afford sites for growth of mangrove. Absence of mangrove on the seaward sides of the outer islands is due to increased turbulence along the high energy shoreline adjacent to the open ocean.

John H. McMurry
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GEOGRAPHY SESSIONS AT THE AAAS MEETING IN NEW YORK

At the annual meeting of the American Association for the Advancement of Science in St. Louis in 1903, William Morris Davis made proposals leading to the founding of the AAG at the 1904 AAAS meeting in Philadelphia. Davis not only recognized the need for a union of geographers, but also realized that geography, particularly in its role as an interdisciplinary field, needed to maintain firm contacts with other sciences and with the broader views of science. The AAAS continues to offer geographers one of their best opportunities to meet these needs.

At the 1960 New York meeting of the AAAS, December 26-31, several steps were taken to increase the effectiveness of the AAG-AAAS liaison, to the benefit of the membership of both organizations. Among these actions were the election of Richard J. Russell of Louisiana State University to the office of Vice President and Chairman of Section E (Geology and Geography), and of Richard H. Mahard of Denison University as Secretary of Section E. Both men are AAG members and are exceptionally well qualified for these positions because of their prominence in both geology and geography. In addition, an attempt was made to attain a balance of interests between geography and geology, and separate offices of Geology Program Chairman and Geography Program Chairman were created for this purpose. These new offices are commensurate with the equal duties and responsibilities of the AAG and the Geological Society of America as joint cosponsors of the Section E program.

The 1960 AAAS meeting was the largest ever held; there were 7,389 paid registra-

tions, and at least another five or six thousand people attended one or more of the 353 sessions. About 1,377 papers were presented at 255 of these sessions; other sessions consisted primarily of special lectures and social functions. There were 152 symposia and 57 sessions of contributed papers. Most of the latter were conducted by 25 organizations whose national meetings were held in conjunction with the AAAS meeting.

Ninety-two geographers and 213 geologists were registered. Of the geographers, all but a few were from the New York area, not counting those who presented papers; some of the latter came from as far away as California, Washington (state), Texas, and Minnesota. In general, attendance for the 89 papers in 14 Section E sessions ranged between 50 and 250 per session. Poor attendance at one of the sessions of contributed papers verifies a fact that has been recognized for some years by Section E officers, namely that, in general, contributed papers are inappropriate for these meetings. Because of the diversity of opportunities offered by the AAAS program and the nature of the audiences, the best use of program time is for presentation of timely interdisciplinary symposia. These should not only be directly pertinent to the fields of geology and geography, but also should be integrated with some of the fields represented by 17 other sections of the AAAS and more than 50 affiliated societies.

A. John Haworth, of the American Overseas Petroleum Company, was Program Chairman for Section E and arranged the geology program. The eight sessions of the geography program were arranged or coordinated by Charles C. Morrison, Jr., of the American Geographical Society. Frank C. Whitmore, Jr., of the U.S. Geological Survey, had chief responsibility, as Section E Secretary, for the program. Not a little of the success of the 1960 AAAS geography meetings may be attributed to the attendance of several of the national AAG officers and particularly to the efforts of Alden Cutshall who continues to ably represent the AAG as its delegate to the AAAS. In 1961, the meetings will be held in Denver; in 1962, in Philadelphia; and in 1963, in Milwaukee.

In New York, the geography program included sessions of contributed papers and symposia on Soviet geography, the future of the New York metropolitan region, late postglacial events in southern South America, programming the use of natural resources, and economic development and investment in Africa south of the Sahara. The geology program featured single sessions on palynology, cave mineralogy, the Mohole, selenology, and a double session dealing with frontiers in the earth sciences; the latter were of special interest to geographers. Howard A. Meyerhoff gave the Vice Presidential address at the Section E Smoker on the subject of Mineral Raw Materials in the National Economy; this was so well received that it has been proposed as a special lecture for the 1961 meeting. Abstracts, and a full account of the Section E program, have been published in the *Bulletin of the Geological Society of America* (Dec., 1960, Pt. II), as has been customary since 1933. This published material was distributed at the New York meeting as a preprint, through the courtesy of the GSA.

The interdisciplinary session on urban renewal, The Urban Frontier: A Conquest of Inner Space, was quite successful; this was arranged primarily in conjunction with the geography program, and papers from it are to be included in a special AAAS volume, together with other planning papers. Similarly, the papers from a four-session symposium on The Sciences in Communist China will be published in a AAAS volume. This symposium attracted world-wide attention, as did a lecture by C. P. Snow on The Moral Un-Neutrality of Science.

George B. Cressey, of Syracuse University, gave an illustrated lecture on his travels in Asia at the Geographers' Dinner. Robert B. McNee, Chairman of the host New York-New Jersey Division, presided and Richard Edes Harrison was toastmaster. An exhibit of some of Mr. Harrison's perspective maps was on view at the dinner. James R. Wray and Robert S. Collins, of the National Outdoor Advertising Bureau, made the arrangements for the dinner. An afternoon reception at the American Geographical Society rounded out the Section E functions for the week.

Charles C. Morrison, Jr.
American Geographical Society

RECENT FOREIGN PUBLICATIONS OF INTEREST TO AMERICAN GEOGRAPHERS

Listed below are some new geographical publications from foreign countries that should be of general interest to members of the profession. A number of highly specialized items, of significance only to a few people, are not included.

The list is made available by the Office of the Geographer, Department of State. It is understood, however, that this office is not in a position to facilitate acquisition of the publications.

Annuario Generale, 1961, Touring Club of Italy, Milano, Corse Italia 10, price not available. A new descriptive gazetteer of Italy. About 1,100 pages. Map coverage at 1:500,000 in sectional maps in back of book.

L'Italia, Storica, Conosci l'Italia, Volume V, Touring Club of Italy, 171 maps and diagrams, 204 photographs, price not available. A new volume in the general series on Italy. The four preceding volumes are: Volume I, *L'Italia, Fisica*, 1957; Volume II, *La Flora*, 1958; Volume III, *La Fauna*, 1959; Volume IV, *Arte and Civilta Nell' Italia Antica*, 1960.

Geografia Economica de Espana y America, F. Cortada Reus, 1959 edition, Editorial Miguel Arimany, S.A., Plaza Duqne de Medinaceli, 7, Barcelona, Spain, 38 maps and graphs, price 225 pesetas ($3.75). An economic geography of Spain and the Americas in Spanish. Material on the economic geography of Spain, 419 pages; on the economic geography of America, 191 pages.

Atlas Historique et Geographique, Vidal-LaBlache, Librairie Armand Colin, 103 Boulevard Saint-Michel, Paris V, France, 410 maps including insets, price 98 N.F. or $20.00. New French atlas with a large format.

Agricultural Regions in the European Economic Community, 1960, European Productivity Agency, Organization for European Economic Co-operation, five large fold-in maps, $1.50. One of a series of publications on the European Community. Obtainable from: Division for Technical Action and Productivity in Agriculture and Food, European Productivity Agency, O.E.E.C., 3, rue Andre-Pascal, Paris 16, France.

Karte der Republik Osterreich, Bundesamt fur Eich- und Vermessungswesen, Vienna, 1960, price $1.02. A new map of Austria at 1:500,000 in one sheet with index pamphlet.

G. Etzel Pearcy
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THE UNITED STATES THEMATIC MAP EXHIBIT AT THE IGU IN STOCKHOLM

Throughout the years, at meetings of the International Geographical Union, geographers of the world have exhibited a variety of maps. These offered subject coverage in topographic, political, economic, and sociological fields, and illustrated new techniques in preparation and presentation. The map displays, however, typically were unrelated in content, style, or areal coverage; were unbalanced in representation between member countries, and from within each country; and were considered by many to be confusing and unstimulating.

For the meetings held in Stockholm, August 5-13, 1960, the Swedish Organizing Committee provided a departure from this situation by organizing the exhibit into three specific parts: thematic maps, national atlases, and modern Swedish maps. Such a designation of specific types of exhibits gave the United States National Committee for this meeting an opportunity to develop a planned and integrated map presentation of a single region – The Salt Lake City, Utah, area. Furthermore, it provided a means to demonstrate the role that geographers and cartographers can play in development of the economic life of a region.

The exhibit. The exhibit consisted of five major integrated elements, all relating to the Salt Lake City area. These were: (a) a 45-foot panel display of maps, charts, and

photos which depicted the physical, economic, and social aspects of the region; (b) a slide-sound machine which presented the region in colored slides, accompanied by a taped recorded sound-track description in French and English; (c) a plastic map-forming machine which produced at the exhibit plastic souvenir maps of the Salt Lake City region; (d) two geographer-guides from Salt Lake City; and (e) a brochure from the Department of Geography, University of Utah, entitled *The Salt Lake Area, Land of Contrasts*, for distribution to each delegate. The final exhibit reflected a contrasts theme, which was woven throughout the presentation and in the series of panels on landforms, geology, climate, vegetation, soil, water resources, mining, steel, petroleum, transportation and urban development problems characteristic of the region. The maps used were obtained from local government agencies and departments, from the universities, from industrial firms, and other sources.

The basic elements of the exhibit were supported in several ways. For example, three individuals from the Army Map Service were present to assemble the plastic map-forming machine, operate it, and discuss the maps and the production process. The Army Map Service prepared for distribution a brochure, in French and English, which explained the map-forming process. Also, several Salt Lake City citizens, currently resident in Europe, aided in establishing the exhibit and provided language assistance.

Choice of region. Once it had been decided that utilization of a single area would be an effective way to present a thematic map exhibit, the basic problem was choice of a region. To a large extent, selection was governed by an earlier decision to use a plastic map-forming machine at the exhibit, which required a subject area having considerable relief. Further, the choice of the Committee was restricted to an area for which relatively small scale (1:250,000) plastic map coverage was already available.

These factors limited alternatives to the northern Appalachians or parts of western United States. The western areas offered more contrast and diversity, and review of existing sheets began. Coverage for Los Angeles and San Francisco was available, but these cities are well known on an international basis. The Salt Lake City sheet appeared to possess all the necessary requisites: mountains and lowlands, forests and barren areas, concentrated and scattered habitations, industry and agriculture, heavy rainfall and deserts. The region was also one with a special history of settlement and development, and was sufficiently unknown by most potential viewers to arouse their interest. Further, there was a strong geography department at the University of Utah which could provide assistance in developing the exhibit.

Significance to geography. It is difficult to measure the impact such an exhibit had on geographers from different countries of the world. Interest expressed by visiting delegates was considerable, and their attendance was large. In general, those participating in the exhibit and the members of the United States National Committee were satisfied that it was well received.

In Salt Lake City, the attention that the exhibit received in the newspapers probably was of significant benefit to geography. Moreover, from the Governor of the State to local officials, there was a new breadth of awareness of the importance of geography, as reflected in the exhibit, to Salt Lake City.

Hundreds of copies of the plastic map have been distributed in Salt Lake City. The exhibit proper is currently on view in the city, and there is no doubt that now the people of Salt Lake City are far more aware of the existence of geographers in their midst, and the work they can do, than they ever were before.

Recommendations. On the basis of experience at the meetings in Stockholm, there are certain recommendations which could be made that might benefit future exhibit planners.

(a) Future IGU Organizing Committees, including the British Committee for 1964, should follow the pattern set by the Swedish Committee in carefully defining specific lines for exhibitors to follow. These need not be the same types of exhibits, but might utilize different themes, such as urban planning, mapping by universities, field work techniques, integrated soil-climate-agriculture studies, and regional exhibits. However, definition of subject material for ex-

hibit would seem of prime importance, both for the Organizing Committee itself and for participating member nations.

(b) National Committees of the various countries should establish Sub-Committees for Exhibits and insure their functioning. Many countries did not exhibit in Stockholm, and others exhibited only a few maps. In several cases, little attention was paid to the technique of displaying maps. Moreover, National Committees and their Exhibit Sub-Committees could do much to ease certain exhibit problems for future Congresses by forwarding materials on time, insuring their proper labelling, and installing the exhibit prior to the opening of the Congress.

(c) Geographers of each member country should assist their National Committees with ideas for exhibits. Most member countries are conducting considerable cartographic work, and much of this is readily adaptable for integrated presentation. Some inventiveness and a dynamic approach to the problem of display on the part of geographers would be most helpful. The fundamental methodology of geography, which involves integrated collection, planning, and presentation, should be evident in some visual form of public display at a geographic meeting of this sort.

(d) Materials and economic assistance should be drawn from a variety of sources. Geographers should work to increase the quantity and quality of materials which can be exhibited, and to dispel lethargy with respect to the exhibits. With regard to monetary backing, an International Congress provides ample opportunity for deriving the greatest possible support from local contributors and governmental sources. The financing of the Salt Lake City exhibit was largely accomplished in this fashion, for it was only through assistance from a number of Federal government departments, authorities in Salt Lake City (Chamber of Commerce, Latter Day Saints Church, Utah State Engineer's Office, Utah Tourist and Publicity Council), and the University of Utah that an expanded exhibit became possible. The point to be made is that a worthwhile exhibit will be supported by many organizations if they are allowed to participate. The major ingredients are ideas, and energetic geographers to develop and integrate them.

Jerry Tuttle
Hercules Powder Company

NATURE OF GEOGRAPHY

On page 20 of the 1961 edition of the Association's *Handbook-Directory*, the price per copy of Hartshorne's *The Nature of Geography: A Critical Survey of Current Thought in the Light of the Past* is incorrectly listed as $2.00 plus $0.20 for handling charge. The correct price is $2.75, including postage and handling. The publication is available from the Central Office of the Association.

NEWS FROM GEOGRAPHIC CENTERS

GEORGIA STATE COLLEGE

The Department of Geography - Geology - Anthropology at Georgia State College in Atlanta was authorized recently by the Board of Regents to offer the Bachelor of Arts degree in geography, making it the second institution in the state to offer a formal program in the subject. The Department was also authorized to give the Bachelor of Science degree in geology.

Chester R. Smith, the Chairman of the combined Department, is rapidly expanding the geology program, while also teaching physical geography. Sanford H. Bederman, along with his teaching duties, is acting as geography consultant for the Social Studies coordinators of the Fulton County and City of Atlanta school systems.

The Department's future looks bright for it recently has installed new furniture and equipment for classrooms and laboratories.

The Department has an excellent wall map collection, a new cartography lab and geomorphology lab, as well as a fine collection of geographical periodicals and monographs in the library. In the next two years, the Department's faculty is expected to triple. Lewis Larson, an anthropologist, will join the staff in September, 1961.

NEW MEXICO STATE UNIVERSITY

The name of the Department of Geography and Geology at the New Mexico State University has been charged to the Department of Earth Sciences. Dr. James I. Culbert continues as Head of the Department.

Dr. Clyde Tombaugh, discoverer of the ninth planet, Pluto, will join the staff of the Department in September. He will teach courses in astronomy and geology. Dr. Tombaugh has had wide experience in the field of earth and space measurements. He directed the expedition to Ecuador to search for natural satellites in the plane of the equator in 1955, was Chief of the Optical Measurements Branch at the Ballistics Research Laboratory at White Sands Missile Range, and more recently has been engaged in the observational patrol and study of the moon and planets.

OTTAWA, UNIVERSITY OF

The four-man Institute of Geography was established at the University in 1952, and since 1957 has been under the directorship of B. Zaborski, formerly Associate Professor at McGill University. At present there are 14 students enrolled for the M.A. and Ph.D. degrees in geography. New premises were occupied in the fall of 1960.

B. Zaborski presented an ethno-linguistic map of Eurasia at the Stockholm meeting of the IGU. He then took leave of absence for the first semester to visit the Mediterranean, Middle East, and Southern Asia. Personal contacts with local geographers were established, and rural settlement and ethno-linguistic patterns were studied.

T. Jost represented the Canadian Association of Geographers at the International Congress of the History of the Discoveries, Lisbon, in the autumn of 1960.

Members of the Institute are at present conducting research on: the street pattern of an ideal planned city (B. Zaborski), the history of geographical explorations (T. Jost), changing agricultural patterns in the prairies (R.D. Vicero), and rural migrations in eastern Ontario (D.M. Ray).

Stanley W. Cosby, member of the AAG, died January 20, 1961. Dr. Cosby was widely known in the San Francisco Bay area, in University of California circles, and in California for his work in soil and agricultural sciences.

Erich W. Zimmermann, former member of the AAG, died February 16, 1961. His death ended a 45-year career of teaching and scholarship. Dr. Zimmermann was the author of World Resources and Industries.

COMMUNICATIONS FROM READERS

THE FORTY-FORTY METHOD

Dear Editor:

Does anyone know to whom should go the credit for discovery of the "40-40" method mentioned in Paul Lydolph's letter in your January, 1961 issue?

I first heard of this method about 25 years ago from a student in one of my classes, who told me he learned it from one of his high school teachers. I called it to the attention of the late Charles F. Brooks, then editor of the *Bulletin of the American Meteorological Society*, who published my note. That is the only mention of the method I have seen until I read Mr. Lydolph's letter.

The superiority of the "40-40" method is so obvious that, after learning of it, I never used or taught any other. It seems strange that authors of textbooks have apparently not heard of it.

Malcolm H. Bissell
Calistoga, California

ANTARCTIC BULLETIN

Dear Editor:

During the past several years an information-packed *Bulletin* has been published by the United States Antarctic Projects Officer. I am fortunate in being one of the recipients of this *Bulletin* and have found it the best single source of information on scientific and other activities in Antarctica. It is edited by a real live-wire geographer, Lieutenant George McCleary.

The publication is available free, and one may be placed on the distribution list by writing to the United States Antarctic Projects Officer, 718 Jackson Place, N.W., Washington 25, D.C. It seems to me that each university library, certainly each Geography Department library, would want to be on the distribution list.

Herman R. Friis
The National Archives

°C AND C°, A REBUTTAL

Dear Editor:

While the subject of °C and C° is probably not worth belaboring further, I do feel constrained to comment on Mr. Arnold Court's letter regarding the matter (*The Professional Geographer*, Vol. XIII, No. 1, January, 1961, p. 39).

In this letter he states, regarding the proposal I made (*The Professional Geographer*, Vol. XII, No. 6, November, 1960, pp. 18-19), that it "has been customary for many of us [to use this procedure] for two decades or more." Meteorological and climatological literature must be rather diligently searched to find any distinction in the symbolic expression of temperature and temperature difference. The Weather Bureau, for example, in presenting a review of December 1960 weather on the back of its daily published weather map (January 31, 1961), shows the temperature departures as °F.

In addition, Mr. Court himself, writing in the *Bulletin of the American Meteorological Society* (Vol. 23, No. 5, May, 1942, pp. 220-238), started out with the "new" sym-

bol but after the first several pages relapsed into the old habit on about nine occasions. Most of these are in graphs where they should have been somewhat immune to typesetters' errors.

Again, writing in the *Bulletin of the American Meteorological Society* (Vol. 29, No. 10, December, 1948, p. 487), Mr. Court spells out the same error in referring to a temperature difference as "(degrees centigrade below 0 °C)."

Mr. Court is certainly correct in saying that the Weather Bureau now uses the name Celsius rather than Centigrade. It is, of course, the same temperature scale and represents only a change in nomenclature.

James A. Shear
The University of Georgia

TEMPERATURE CONVERSIONS

Dear Editor:

It was very interesting to read James A. Shear's article, entitled "°C and C°", in the November, 1960 issue of *The Professional Geographer*. Permit me to write a few lines in continuation of his observations.

I discourage the student to memorize the conversion formulae altogether, and instead ask him to use the fundamental principle of thermometry, as follows:

> If F° and C° refer to the same temperature, then
>
> $$\frac{F-32}{212-32} = \frac{C-0}{100-0}$$
>
> or
>
> $$\frac{F-32}{9} = \frac{C}{5}$$

The distinction between F° and °F is very important indeed. It has already been suggested by Conrad (*Methods in Climatology*, second edition, Cambridge, 1950, p. 13 footnote), who uses F and °F to denote the difference. The practice should be followed more widely in geographical literature. The same principle as suggested above should enable the student to understand the difference between the two and to convert temperature differences correctly.

P. K. Sircar
Panjab University
Chandigarh, India

SOLSTICES AND EQUINOXES

Dear Editor:

As a temporary resident of the southern hemisphere, in the capacity of Visiting Professor at the Graduate School of Geology of the Brazilian National Petroleum Corporation in Salvador, Brazil, I am developing increasing respect for the capabilities and potentialities of the countries and peoples of this awakening continent.

Necessarily, many foreign technical books are still widely used here. I am often amazed at some of the unintentional reflections on the relative importance of the southern hemisphere encountered in our writings.

One of these has to do with the naming of solstices and equinoxes. Most northern hemisphere texts refer to winter and summer solstices, and vernal and autumnal equinoxes, in accordance with seasons that happen to prevail in the northern hemisphere. It must be with mixed feelings that a South American reads that the *winter* solstice occurs in December, at the beginning of his summer; that the *summer* solstice is at the beginning of his winter; that the *vernal* equinox is at the beginning of autumn; and that the *autumnal* equinox is at the beginning of spring! How much more logical, and more appreciative of the sensitivities of our South American friends, to refer instead to the December and June solstices, and to the March and September equinoxes.

Arthur David Howard
Stanford University

TO BRIDGE THE GAP . . . .

Dear Editor:

Methodologists agree that geography has an exceptionally wide scope. However, it seems not broad enough to embrace the work of the mathematical geographers. Such an inconsistency is apparently the result of misunderstandings in three areas: (1) what scientists in other fields are doing; (2) what mathematical geographers are attempting to do; and (3) what goals mathematical geographers are striving for in geography.

If we examine the development of other disciplines, we can see that all have a convenient division between descriptive and theoretical work. Researchers in each aspect of the field recognize the importance of the other. Neither proposes to displace the other. Each appeals to certain scholars. Clinical and experimental psychology and theoretical and applied economics are examples. These fields, too, have their unique and general ways of looking at things. An individual clinical case is always unique; at the same time it is usually representative of general principles. The question is not which approach is right or better, but which is most appropriate to the particular problem. Not infrequently, scholars are able to combine these approaches for a particularly satisfying contribution.

The work of mathematical geographers is of two kinds. Some use statistics in order to organize and classify data, to test whether certain concepts or relationships are valid, and to determine the degrees of their validity. Statistics are designed to tell us whether generalizations are proven by very few exceptions, or are invalidated by a great many. Such studies are often criticized as belaboring the obvious, and frequently this may be true; yet, many so-called obvious truths in science have proven obstacles to ascertaining the real truth. Much of statistics, therefore, is rightfully a tool of the descriptive geographer, and is employed to supplement more traditional methods of research.

The other type of research performed by the mathematical geographer may be called theoretical. The goal is to seek explanations of the geographical landscape we observe—for example, why a settlement pattern looks as it does. Attempts at explanation by geographers often met with failure in the past, frequently owing to inadequate methods. The reaction against environmental determinism led to an extreme descriptive approach which hinders acceptance of new experimental work.

If we look again at the experience of other fields, we find that theoretical progress was possible only with the adoption of mathematical techniques, disconcerting as the prospect seemed. Without them, observed facts seemed to be too many, too diverse, and too individual to warrant successful generalization. The necessity to deal with many variables at once, in their proper relation, led to this more efficient approach. The model, or simple theory in mathematical form, became a common vehicle of theory. Geography, too, will find it necessary to use mathematics to insure theoretical advance, save time, and avoid unwarranted generalization. Devised theories must certainly stand the test of observed facts. Indeed, they are usually suggested by them.

The use of models is frequently criticized as unrealistic. Of course, theoretical work varies in the degree to which reality is duplicated. Most critics fail to appreciate two facts. First, all theories are tentative and partial; no one may claim his is sufficient. Second, a model does not necessarily seek to reproduce reality; the purpose is often to discover the most important out of many forces. This makes it possible to assign them their relative importance, to find out how well a simple explanation accounts for the observed facts and helps to uncover further factors. Such theoretical work is young; of course there is not a great deal. However, the attitude of discouraging such work until it proves itself is unfortunate, for it makes it doubly difficult for those who are interested, and may deprive the field of worthwhile contributions as well as outstanding students with a theoretical bent.

Perhaps the most disquieting aspect of theoretical geography is that it seems to lead to a different conception of geography. The descriptive view of geography logically leads to a goal of the integration of diverse systematic phenomena in a regional context. A theoretical orientation, however, has as its goal the explanation of locational patterns and interactions, as for example world trade, and seeks to understand the role of spatial

characteristics: distance, area, relative location, shape, concentration, and dispersion. The region is a vital kind of locational pattern or complex. It is essential to understand that we are not faced with a decision as to which concept is valid. We are attacking a large unknown world with different tools and complementary goals. Ultimately both become the same: to understand the interaction of all phenomena in all regions is to understand the interrelations of the locational patterns of all phenomena. Geography though old, is also young, for the goals, however defined, are vast. Descriptive and theoretical approaches, often combined in the same study, can be complementary and mutually helpful. The theoretician often derives his ideas from maps and descriptions. In any event, he is utterly dependent upon them for verification of his concepts. On the other hand, the regional geographer may make far more penetrating analyses if they are enriched by the ideas of the theoretical geographer. There is no need to choose sides, no point in claims of exclusive truth. Any gap may be bridged in our common attempt to produce the good work that is needed, if geography is to make contributions commensurate with its importance.

Richard L. Morrill
University of Washington

HANDBOOK - DIRECTORY, 1961

Herman R. Friis

Editor-in-Chief

ii and 192 pp., $4.00

Central Office, Association of American Geographers

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NEW PUBLICATIONS

Regions, Resources, and Economic Growth. HARVEY S. PERLOFF, EDGAR S. DUNN, JR., ERIC E. LAMPARD, AND RICHARD F. MUTH. Published for Resources for the Future, Inc., by The Johns Hopkins Press. Baltimore. 1960. xxi and 716 pp. illust. $12.00.

Resources for the Future, Inc. sponsors publication of a series of books which collectively deal with the nation's natural resources and their role in the American economy. Most recent of these is *Regions, Resources, and Economic Growth.* This study arises from the desire to know more about factors accounting for economic growth, which may differ widely among the several geographic regions. Regions, states, and cities are seeking to raise their levels of living by attracting industrial payrolls. It is increasingly evident that efforts to attract industry can be wholly successful only if they are based upon a knowledge not only of trends within the region but also upon the specific requirements of the industry and the probable impact upon the economy. This book attempts to provide a conceptual and methodological framework to serve as a guide to research in regions.

The three chapters in Part I review economic growth by multi-state regions since 1870, and by individual states since 1939. In the four chapters of Part II, mainly theoretical, a framework of analysis is set up by examining the factors which underlie regional economic growth.

The eight chapters of Part III are concerned with regional economic development from 1870 to 1910, and from 1910 to 1950. This historical section develops the theme that, despite the convergence of the demographic labor force and income structures among the eight major regions of the United States, there are still important regional differentials.

The eight chapters of Part IV deal with the regional distribution of manufacturing and agriculture between 1939 and 1954.

Whereas Parts III and IV are concerned mainly with the volume of economic activities in the several regions, and in the forces causing the differing growth rates, Part V emphasizes income levels and rates of growth in per capita income from 1920 to 1955 in the various regions and states.

Although neither the approach nor most of the terms used are geographic, this is one of the most rewarding books for economic geographers to appear in a long time.

ALFRED J. WRIGHT
The Ohio State University

A Regional Geography of Western Europe. F. J. MONKHOUSE. Longmans, Green and Co., Inc. New York. 1959. xx and 726 pp. illust. $9.75.

Proponents of the regional school of geographic thought will cheer, and opponents bemoan, the organizational pattern of this book; but all will agree that, regardless of its structure, here is a veritable gold mine of solid geographical information about one of the most significant portions of the world.

The volume, sixth in the Longmans' series of Geographies for Advanced Study, represents a detailed regional analysis of France (except Corsica) and the Benelux countries. No attempt is made to treat the separate countries as individual entities; instead, regions are based on geological and physical-geographical criteria which transcend political boundaries. Each of the 20 major regions, whose names are familiar to any student of European geography, is divided into a number of subdivisions; and all units, large and small, are analyzed in both their physical and human facets by a master scholar who is intimately familiar with his subject.

This is no book for the undergraduate

major in geography. It is far too detailed in its treatment. But for the advanced graduate student with a keen interest in Western Europe, and for his teachers as well, Monkhouse's opus provides a storehouse of knowledge to be tapped when needed.

The study is beautifully illustrated with 64 glossy half-tones bled to the page margins and 141 maps and diagrams, and is well supplied with references. It is a worthy member of the publisher's illustrious geographical series, and a fit companion to the earlier books written by the author.

G.F.D.

A Guide to Historical Cartography, 2nd edition. WALTER W. RISTOW AND CLARA E. LEGEAR, compilers. Map Division, Reference Department, The Library of Congress. Washington. 1960. 18 pp.

This is a compilation of 67 references to which a student of historical cartography can turn for assistance. The list is annotated and arranged by author, but a secondary classification by subject is provided in the index. The authors point out that their purpose is to select works "which would constitute in essence a 'ready reference shelf. . . .'", and partly for that reason not much mention is made of articles in serials and journals.

Such an annotated list would be useful for the student, but there is no indication of how he might obtain a copy since it is stated only to be "Free to Libraries and other institutions upon request to the Publications Unit, Office of the Secretary," presumably of the Reference Division of The Library of Congress. For the occasional instructor of a course which contains some part of the fascinating history of early cartography, it will be especially useful for its annotations. Any such compilation must be selective, and one cannot argue strongly with the experience of the selectors; but one can question their decision to "limit the period of historical cartography to the end of the eighteenth century." This practice of students of historical cartography has little to recommend it and will become increasingly embarrassing as time goes on. The great developments in cartography since that period continue to be treated only superficially.

A.H. ROBINSON
The University of Wisconsin

International List of Geographical Serials. CHAUNCY D. HARRIS AND JEROME D. FELLMANN, compilers. Research Paper No. 63, Department of Geography, The University of Chicago. The University of Chicago Press. Chicago. 1960. xlix and 189 pp. $4.00.

During the decade since 1950, the year when the last predecessor of this work was published, many new geographical serials have been started. The title has changed from *Union List* to *International List,* and the roster of collaborators from some 50 countries who have reviewed the entries from their particular localities shows that this undertaking is truly international in scope. That it is designed to serve many outside the English-speaking world is demonstrated by the fact that a half-title page gives the title in eight languages and that translations of the Introduction and Explanation are given in English, French, German, and Russian. Titles in non-Latin alphabets, such as Greek, Chinese, and Russian, are given in transliterated or translated form, as well as in the original. The compilers have used a handy, eye-catching device to designate which serials are currently being published, and entries included in this group are given more comprehensive treatment. For those who do not have at hand *Orbis Geographicus 1960,* the addresses will be useful.

A change in arrangement from the 1950 edition is time-saving; entries are listed alphabetically by country, instead of by continent and then by country. Scholars may still find it expedient to refer to the 1950 edition for holdings of periodicals in various libraries, as it was not practicable to include such information in the current edition. Although that boon to librarians and students, the *Union List of Serials in Libraries of the United States and Canada,* now has a new edition in process of preparation, it will be some time before it is published. Meanwhile, the 1950 edition of the book being reviewed will be useful for determining locations of geographical serials.

The basic stock of entries for the present

work came from the 1950 edition, with the addition of new titles gleaned mainly from *Current Geographical Publications* and *New Serial Titles: Classed Subject Arrangement.* There have been deletions as well as additions since 1950; entries have been reevaluated for their essential geographical qualities. More lenience has been shown in retention of older serials, geographical in name but not in content, from the period before the rise of a specialized academic discipline of geography.

Geographers and librarians owe a debt of gratitude to the compilers for this most useful tool. To all who have been involved with the pitfalls of bibliographical work and the vagaries of serial publications, the enormity of the task, so capably executed, is appreciated. We rise up and call them blessed!

NORDIS A. FELLAND
American Geographical Society

The Earth's Problem Climates. GLENN T. TREWARTHA. The University of Wisconsin Press. Madison. 1961. 334 pp. illust. $7.50.

This is indeed a book that will be welcomed by geographers. How many of us there are who have, with guilty conscience, passed over the unexplained anomalies that distort the regular pattern of world climates while teaching the freshman class in physical geography. And who among us has not been disturbed at other times by inadequacies in explanations for such anomalies, even when the explanations are proffered in the professional literature.

Here, now, are the answers, or in some cases at least the rudiments of answers, to many of the problem climates of the world. Why should the dry climates of Pacific South America have such a wide latitudinal range? Read Trewartha. Why does the Patagonian desert extend eastward to the Atlantic? Read Trewartha. What accounts for regions of reduced and highly seasonal rainfall in the southern islands of Indonesia? Read Trewartha. Similar questions by the score, and for the world, could be mentioned—and all would receive a common reply, read Trewartha.

This is not a book for the beginner; the author presupposes that the reader already has a goodly fund of basic climatological knowledge. Indeed, only one possessing such knowledge could be cognizant of the existence of the problems posed. But the contents of the book do not make difficult reading for the professional. Instead, they are marked by a lucidity of style and phraseology that is rare in modern scientific writing.

Contents of the book are packaged in five Parts: Latin America; Australia—New Zealand—Equatorial Pacific; Africa; Southern and Eastern Asia; Europe and the Mediterranean Borderlands; and Anglo-America. No attempt is made to achieve comprehensive coverage of the climates of these areas, for the materials are designed "to supplement the existing books on regional climates and do not cover the same ground."

This is one of the few *essential* books for all geographers. No one in the profession can afford to be without it.

G.F.D.

Bananas. N. W. SIMMONDS. Longmans, Green and Co., Inc. New York. 1959. xvi and 466 pp. illust. $9.50.

The first 128 pages of the volume are devoted to: (1) a brief but comprehensive treatment of the botany of the banana plant, including its vegetative morphology and flower and fruit development; (2) discussion of a key for classification of edible bananas, and a classified list of somatic mutants in bananas; and (3) brief botanical descriptions, geographical distribution, and status (cultivated or wild) by individual clones (types) and groups of the two series of edible bananas—the Australimusa and the Eumusa Series, with a 26-page annotated list of clones by countries. Of the many types of bananas, Gros Michel, the most abundantly produced, is the basis of the banana export trade of Central America, Ecuador, and Colombia. Dwarf Cavendish, the most widely grown, comprises most of the exports of Martinique, Brazil, Canary Islands, African areas, Palestine, and Australia. Robusta is the basis of the exports of the former British Lesser Antilles, Guadeloupe, Samoa, and Fiji. Total banana production of the world is estimated to be about 20 million tons per annum, of which 15 per cent enters world trade. Of the bananas entering trade, some 63 per cent is

Gros Michel, and 26 per cent Dwarf Cavendish.

One hundred eighty pages are devoted to what may be termed the relations between physical and economic conditions of production, and the distribution of commercial bananas. Of special interest to the geographer are analyses of relations of temperature, amount and distribution of precipitation, winds, drainage, soil types, and plant foods; techniques of production – planting, cultivation, pruning, manuring, spraying, irrigation; yields and life of a plantation; methods of harvesting, transporting, ripening, and utilizing the fruit; and economics of production and the over-all agricultural and human importance of the crop.

The last four chapters include an analysis of world trade in bananas from the historical point of view; an annotated list of banana pests; rather detailed treatment of the three most destructive diseases–Panama disease, Sigatoka leaf spot, bunchy top virus; short accounts of minor diseases; and banana breeding.

This thorough, scientific volume is based upon years of research, wide field studies in America, east Africa, the Pacific, and southeastern Asia, and 16 years of experimentation on bananas at the Imperial College of Tropical Agriculture, Trinidad. Valuable features of the book are the comprehensive treatment of cultivated bananas and the emphasis given to peasant and subsistence production, the importance of which has been underestimated in comparison to the export trade. Nearly 100 excellent photographs, 40 some charts, diagrams, and maps, and 55 tables effectively supplement the textual materials.

CLARENCE F. JONES
Northwestern University

The Industrial Geography of the Port of Genova. ALLAN L. RODGERS. Research Paper No. 66, Department of Geography, The University of Chicago. The University of Chicago Press. Chicago. 1960. ix and 144 pp. illust. $4.00.

Ports, and the industries that have grown up near them, have received increasing attention from geographers in recent years. This study of the port of Genova is in line with the work of the Commission on Industrial Ports of the International Geographical Union and the studies of ports by the late F.W. Morgan and others. Its purpose is limited; it is a study of "the significance of port location in the development of industry in Genova, and the role of commodity flow through the port in the operation of the major industries of the area." Within this framework, however, the study is detailed, scholarly, and revealing.

The preparation of such a work is fraught with considerable difficulties, especially in the collection of statistics of raw materials handled and of the production and distribution of manufactured goods. The author uses tonnages of goods, and wishes that the sources available had permitted him also to use values. It is possible that his flow-diagrams might not have been greatly different if he had done so.

His conclusions show how much our widely accepted generalizations about port industries need modification. The port was of mixed importance in the growth of manufacturing industries in Genova. Certain dominant industries, including the iron and steel industry, which is the subject of a searching examination, owed their rise to the role of Genova as a break of bulk point. But a number of industries were attracted by the market provided by the ship-building industry, a market which has in some cases almost vanished. Others have no relevance to the fact that Genova is a port.

This is a careful and critical study. The author calls for analyses of other and contrasting ports, to serve as a basis for more accurate generalizations. These cannot do better than follow the excellent model provided by Rodgers.

NORMAN J.G. POUNDS
Indiana University

Moon Maps. H.P. WILKENS. The Macmillan Company. New York. 1960. 38 pp. and 27 unnumbered pages of maps. $6.00.

As of this date there is no such subject as human lunography, but certain aspects of the Moon's physical character are well known to man. The above atlas represents an up-to-date resume of the present state of knowledge concerning surface features of almost the entire area of the satellite, including those on most of the far side that

were discovered through the Soviet space-rocket Lunik III.

The book consists of two parts: (1) a 28-page gazetteer, which lists alphabetically the names of the dark plains and 700 of the principal craters of the Moon's near side, briefly describes the horizontal and vertical dimensions of these features, and states their map location; and (2) a series of 25 page-size sectional maps of the near side of the Moon, at a scale of 55.4 miles to the inch, which depict approximately 90,000 surface features. Two additional maps also are included, one showing in great detail the large walled plain of Ptolemy, and the other the far side features charted through Lunik III. The gazetteer and maps are ingeniously arranged in a double spiral binding so that any page of text and any map can be placed in a flat position next to each other to facilitate reading.

When man lands on the near side of the Moon he will not be entering *terra incognita;* and venturers to the satellite's far side will have at least a general knowledge of the surface conditions to be encountered. Since the field of human lunography appears to be on the threshold of birth, it behooves members of the geographic profession to prepare themselves for this blessed event.

G.F.D.

Transportation and Physical Geography in West Africa. BENJAMIN E. THOMAS. Special Technical Report, Human Environments in Central Africa Project, National Academy of Sciences-National Research Council, Division of Anthropology and Psychology. University of California, Department of Geography. Los Angeles. 1960. 54 pp. illust.

This analysis, by one of the most competent and painstaking researchers on African transportation, examines the correlation between physical geographical factors and the functioning of road and waterway transport in the area formerly known as French West Africa. Occasionally, examples are drawn from other West African countries. Railways are mentioned here and there; but ports, seaways, and airways are not included in this preliminary report.

Three broad physical zones are distinguished. First is the Saharan zone, where the character of the surface, the limited water supply, and the sometimes excessive temperatures are the most significant facts in regard to the movement of motor vehicles and camel caravans. Second is the Sudan or Sahel zone, where seasonal change in rainfall is the dominant factor affecting navigation on the Senegal and Niger rivers and the state of local roads. Third is the Guinea Coastland, where landform and drainage factors (fall-line escarpments, lagoon bars, etc.) preclude utilization of waterways for penetration inland, and vegetation obstacles (tropical rainforest, mangrove growth) cause difficulties in cross-country movement.

Incorporated in the text is a series of 24 maps, of which a set of 12 showing monthly changes in usable roads and waterways are particularly significant. A few notes on the maps, and a short bibliography, complete the main body of the work.

The report is of prime interest to those concerned with military science, economic development, and transportation matters in the western sector of Africa. It could also provide good introductory reading for beginners in transportation geography, or food for thought for experienced transportation geographers since it certainly would sharpen their powers of observation in the field.

IRENE S. VAN DONGEN
Columbia University

Indian Life in the Upper Great Lakes: 11,000 B.C. to A.D. 1800. GEORGE I. QUIMBY. The University of Chicago Press. Chicago. 1960. xv and 182 pp. illust. $5.95.

All knowledge is in reality a unity. The broader works in any scholarly field are forever reemphasizing this fact. *Indian Life in the Upper Great Lakes* is such a study. It is anthropology, geography, geology, history – and the list could be extended. Its purpose is to describe the changing ways of life in the Great Lakes region during the 13,000 or so years since the ice retreats made the southern part available to man. In the sense that one aspect of geography has been called human ecology, this study could be called geography. Changing cultural man and changing physical geography react throughout these millenia in this unusual area.

The Great Lakes rose, fell, expanded, and shrank amazingly during this period, depending on ice-blocked drainways and on isostatic crustal adjustments. These events were, of course, related to climatic changes in terminal glacial time. Vegetation changed. So did the animals. So did human cultures. Some changes were causally related: the climate changed, the ice melted, vegetation belts shifted, so did such animals as mastodons, and so did the men that hunted them. The ancient lake shore lines provide datum planes, and the human sequence can be placed in reference to them.

The study is valuable in many ways. American archeology boils with a swift flood of detailed technical papers. There are few good general regional studies that one can turn to for an overall view. This is provided here. In the process, many gems of detailed information are included: population density estimates, by tribe and area, and through time (the agricultural Huron with 10 per square mile and the forest hunting Chippewa with one person per two square miles); dates on lake stages; animal disappearances; cultural survivals. Many problems, however, are left as questions (are the Copper Eskimos cultural survivors of the Old Copper culture?).

This is a beautifully printed, well written, authoritative, valuable summary filled with important material for geographers interested in the cultural process as seen in action through time in a changing environment.

GEORGE F. CARTER
The Johns Hopkins University

The Geological Evolution of North America: A Regional Approach to Historical Geology. THOMAS H. CLARK AND COLIN W. STEARN. The Ronald Press Co. New York. 1960. vi and 434 pp. illust. $7.50.

Textbooks on historical geology traditionally are organized on a chronological basis; that is, their contents are divided according to the subdivisions of geologic time. This book represents a new approach to the subject, for its materials are presented in terms of the three major structural units of North America: the bordering geosynclines, the stable interior, and the Canadian Shield. Such a geographical orientation proves peculiary useful to the geographic reader.

Part I, Introduction, disposes of the usual preliminaries; but it also includes, strangely enough from the organizational standpoint, all materials dealing with the first of the three main areal units—the stable interior. Part II is entitled The Applachian Geosyncline; Part III, The Cordilleran Geosyncline; Part IV, The Continental Nucleus [Canadian Shield] and Northland; and Part V, The Evolution of Life.

In the accepted sense, this work is historical geology; but, because of its areal organization, it could with equal validity be termed historical geography in the broadest meaning of the term. In fact, the authors define historical geology as the "compilation of as nearly a continuous picture as possible of the geography, life, and working processes of the earth during its whole existence." Regardless of the niche of knowledge occupied by the book, its contents certainly are of interest and significance to the physical geographer. This reviewer can recommend it highly, both as a "refresher course" to those who have earlier been exposed to the subject, and as a "first reader" to others who have an acquaintance with physiography and physical geology but who have not delved into the more advanced field of historical geology. The book is beautifully illustrated, completely up-to-date in content, and uniquely organized to suit the geographic mind.

G.F.D.

A Site Selection Security Study for West Virginia. State of West Virginia, Economic Development Agency. Charleston. 1960. 20 pp. illust.

This is a study designed to attract industry to the State of West Virginia. It is promotional in style, but there are several aspects of the publication which set it apart from ordinary promotional literature. The central theme is to show the importance of locating industry in mountainous topography for maximum security in potential nuclear war. The author skilfully develops the geographical advantages of West Virginia: location near the large industrial and commercial centers of the East and Mid-West, protection afforded by mountains, the potential for

underground installations in limestone caverns and coal mines, the role of good air drainage in cleaning the area of radioactive dust, the advantage of a constant flow of fresh water to flush out watersheds and carry away polluted water, an adequate rail and highway net to serve the State, and a labor force which is characterized by stability because some 40 per cent live on subsistence farms.

The West Virginia Economic Development Agency study is an example of a geographical analysis which can contribute to a solution of a major national problem—the protection of industry in case of war. The problem has both economic and military significance in an age when nations have the capacity to destroy each other's cities and even entire regions. The study suggests a way of locating industry which would provide a high degree of protection against modern weapons. In view of present capabilities of nations for destructive attack, it does not appear defeatist to consider locating industries in mountains or even underground for protection.

L. W. TRUEBLOOD
U.S. Government

The St. Lawrence Seaway: Its Impact, by 1965, Upon Industry of Metropolitan Chicago and Illinois Waterway-Associated Areas. JOSEPH A. RUSSELL, JEROME D. FELLMANN, HOWARD G. ROEPKE, AND ALFRED W. BOOTH. State of Illinois, Division of Industrial Planning and Development, and the Chicago Association of Commerce and Industry. Vol. 2. 1960. 71 pp. $5.00.

This is the second volume of a general study, made by members of the Department of Geography of the University of Illinois, on the effects of the St. Lawrence Seaway upon industrial development in the Chicago metropolitan area, and in those portions of the hinterland of Chicago accessible directly or indirectly via the Illinois Waterway. The study was conducted before results of the first two seasons of operation of the Seaway were available.

The first part of the volume consists of a brief general survey of agricultural, mineral, and industrial production and employment in the Chicago hinterland, together with general population statistics, antedating the 1960 census. The second part contains a brief and generalized description of the transportation patterns of the Midwest, focusing upon Chicago, together with a characterization of rate structures. This is followed by a paragraph or two of description of the facilities at Chicago, and at each of the other Great Lakes' major ports, for handling water-borne commerce. The authors point out the relative adequacy of facilities at the Port of Chicago, which in their opinion will insure predominance of the port for at least the next few years. Part Three is concerned with prospective changes in transportation that will affect Chicago, including the effect of the Seaway upon rate structures, and probable enlargement of facilities at the Port of Chicago as well as along the Illinois Waterway. The final part is a brief description of present and prospective movements of selected commodities which may travel, via the Seaway, to and from the Chicago area. The authors categorize these items into one of four groups with relation to their prospective degree of change as a result of the availability of Seaway transportation. In general, the authors reach the conclusion that the Seaway, in the short run, may have important effects, both positive and negative, upon certain individual industries, but that Chicago's over-all economy will be affected.

These conclusions are generally borne out by the results of the first two seasons of complete operation of the enlarged St. Lawrence Seaway. Traffic has been far above previous volumes on the St. Lawrence route, but substantially below the pre-opening estimates of the Seaway's more enthusiastic promoters. However, several nonrecurring situations prevented the full potential of the route from being immediately realized: technical difficulties attendent upon the opening weeks, delays to traffic during prolonged dedication ceremonies, continuation of operation of small obsolete ships which are now being retired, the protracted steel strike, and the general business recession.

More significant than the immediate effects during the first few years are the potential long-run effects. Here the Seaway is of great potential significance to the economy of the Midwest, though it will be difficult to isolate Seaway-related developments

in that area from general trends which would result from international and national shifts regardless of the Seaway. The Seaway is one among many facilities which will be of aid to the Midwest in retaining its general position among the economically significant regions of the continent.

HAROLD M. MAYER
The University of Chicago

The Lapps. ROBERTO BOSI. Frederick A. Praeger, Inc. New York. 1960. 220 pp. illust. $6.50.

This book is attractively illustrated with both drawings and photographs. Translated from the Italian, it was printed in Great Britain as part of the Ancient Peoples and Places Series of Thames and Hudson, and is now being distributed in the United States at a notably higher price.

The rather brief text touches on most aspects of the Lappish environment and the life of the people, but, in accordance with the series in which it appears, most of the author's attention is focused on the origins, prehistory, and early historic records of the Lapps. Extended discussions compare elements of Lapp material and non-material culture with archeologic records from the Upper Paleolithic in France, prehistoric sites from northern and eastern Russia, ethnographic accounts of the peoples of northeast Asia, from the Samoyeds to the Ainu, and even the inhabitants of Arctic North America. The author is sufficiently cautious in qualifying all the parallels he draws to evade any charge of dogmatism or fantasy in culture-historical reconstruction. In fact, he never reaches any indentifiable conclusions. Bosi might be complimented for presenting the evidence and permitting the reader to draw his own conclusions, but this reviewer is convinced that only a tiny fraction of the necessary evidence, and not the most relevant part of it, is presented. Gutorm Gjessing's *Changing Lapps* or Johan Turi's autobiographical account make better reading and are more informative. A generous excerpt from the latter is readily accessible in Coon's *Reader in General Anthropology.*

Other than the illustrations, the book's substantive merit lies in its collation of the earliest historic accounts of the Lapps, going as far back as Procopius. Of side interest is the question of how an Italian, using in large measure Italian sources, should happen to have written a semi-popular account of this far northern people for an English audience. Although it is less widely recognized than the fascination that the antique Mediterranean holds for North Europeans, the bleak Far North seems to hold a similarly intense attraction for men of the south.

HOMER ASCHMANN
University of California at Riverside

Flood Proofing: An Element in a Flood Damage Reduction Program. JOHN R. SHEAFER. Research Paper No. 65, Department of Geography, The University of Chicago. The University of Chicago Press. Chicago. 1960. xiv and 198 pp. illust. $4.00.

This report analyzes the advantages and disadvantages or limitations to flood proofing, i.e., rendering buildings, contents of buildings, and grounds less vulnerable to flood, by citing examples of flood proofing in several cities and presenting Bristol, Virginia-Tennessee as a case study in economic feasibility of such a program.

The study, although a Department of Geography research paper, is not primarily a geographic treatise. Nevertheless, it is of interest to geographers since it exemplifies the application of data and conclusions derived from geographical research methodologies toward the solution of very practical problems.

Chapter II of the study, entitled Selecting an Urban Place for Study, presents best the potential role of the geographer in studies of this nature. The chapter contains a description of the drainage basin of the principal stream of the area, particularly of the section of the flood plain on which a portion of the city is located, a history of urban development in Bristol, a land use study of the urban area, and finally a history of flooding in the area. In all of these aspects of the study, those specific geographical and historical elements which would seem most to apply to the solution of the problem are stressed.

Other chapters in the monograph are chiefly concerned with engineering and constructional matters and presentations of the economic, legal, and political considerations

which are inherent to the problem of flood proofing.

ALFRED W. BOOTH
University of Illinois

The Human Use of the Earth. PHILIP L. WAGNER. The Free Press of Glencoe, Ill. Chicago. 1960. ix and 270 pp. illust. $6.00.

Dr. Wagner, assistant professor of human geography at the University of Chicago since 1955, attempts in this book to bridge the gap between the conventional aspects of geography (which are largely descriptions of the natural environment and of the distribution over the earth of man and his various activities) and the life that man actually lives. Since mankind is profoundly affected by the artificial environments which he has created, and almost all parts of the natural environment have been modified by man, Dr. Wagner contends that geographers should devote most of their efforts to studying these artificial environments and adjustments to them, leaving to nongeographers the study of the natural environment. He declares, for example, that "climate generally has a slight effect on man," although he admits that it affects the vegetation, and that weather affects man.

The research program which Wagner urges that geographers follow is a study of the so-called systems of production, communications, commerce, culture, language, and so forth. In this book, many suggestions are made along this line. It contains numerous footnotes referring to anthropologists, sociologists, philosophers, ecologists, and economists, but very few to geographers except Sauer, under whom the author studied. It has two maps, one showing the location of 37 tribes discussed, most of whom are unknown to most geographers; the other shows "economic organizations of the world, 1950," a surprising map.

The title of the book is misleading; a better title would be *Essentials of Human Geography: A Study of the Environments Made by Man.* Likewise, the titles of the chapters are not revealing. In brief, this book is a scholarly, highly advanced polemic with innumerable unusual words and definitions as to man's artificially created environment. It departs widely from descriptive geography, and geographers who read it will profit by so doing.

STEPHEN S. VISHER
Indiana University

Investigations on Norwegian Cirque Glaciers. W.V. LEWIS, ed. R.S.G. Research Series: No. 4. The Royal Geographical Society. London, England. 1960. 104 pp. illust. 22 s 6 d.

This publication should be in the library of every student of glaciology. Primarily, it presents the results of the intensive investigation of two small cirque glaciers in Jotunheimen, Vesl-Skautbreen and Veslgjuv-breen. W.V. Lewis, of the Department of Geography at Cambridge University, was the chief mentor for this work. Although most of the results have become well known since the work was carried out nearly a decade ago, the present volume is useful as a comprehensive summary of one of the most detailed glaciological studies yet attempted; in this sense it is a classic memoir.

There are nine chapters in the book. The most significant is by John G. McCall, a promising young glaciologist who died soon after completing his studies of Vesl-Skautbreen. McCall and his colleagues drove two tunnels through this glacier, from the surface to bedrock. One tunnel was in the ablation zone and the other in the zone of accumulation. This technique permitted englacial studies of ice movements, bands and layers, temperatures, densities, petrofabrics, and similar phenomena, as well as first-hand insights into the nature of erosional processes below the bergschrund at the ice-bedrock contact.

Following an introductory chapter by W.V. Lewis, the Pre-Cambrian gneisses of Jotunheimen are described by M.H. Battey in connection with their role in cirque formation. The third chapter, by Jean M. Grove, is an analysis of the bands and layers of Vesl-Skautbreen, based primarily on studies in the tunnels. Mrs. Grove, in Chapter VII, also presents information about the structure and regime of Veslgjuv-breen, a compound cirque glacier. Her work on the latter is effectively complemented by the movement surveys carried out by J.E. Jackson and Ena Thomas, as described in Chapter VI. Raymond J. Adie

contributed a chapter on ice-petrofabrics as a result of his Universal Stage investigations in the tunnels. A chapter on bergschrund temperatures and their relation to frost-shattering, by W.R.B. Battle, also now deceased, and a summary chapter by Lewis complete the book. In the latter, Lewis applies McCall's findings, and his own evidence for rotational movement within cirque glaciers, to the formation of Blea Water corrie in the Lake District of Britain. The book is very well illustrated with maps, diagrams, and photographs.

CHARLES C. MORRISON, JR.
American Geographical Society

Population and Society: Introduction to Social Morphology. OTIS DUDLEY DUNCAN AND HAROLD W. PFAUTZ, translators. The Free Press of Glencoe, Illinois. Chicago. 1960. 207 pp. $4.50.

This book is a translation of Maurice Halbwachs' *Morphologie sociale,* which was first published in 1938. It is an essay in sociological theory which is not without interest to population geographers. Halbwachs develops the thesis that tangible forms of societies are directly related to, if not actually determined by, density and distribution of population. He argues that distinctive patterns and densities of population create a collective psychology which influences social forms, and also recognizes the reverse, that changes in social forms may alter the density and distribution of population. Essentially, he outlines a sociological approach to the study of population.

The Translators' Preface places Halbwachs' work in the broader framework of sociological theory, with special attention to similarities between the social morphology and human ecology schools of sociological thought. The essay itself is divided into three parts. The first considers the interaction of population distribution and density with religious, political, and economic activities. The second, which treats population distribution and migration, is least satisfactory geographically. The third is concerned with the sociological significance of such demographic phenomena as sex ratio, age composition, natality, nuptiality, mortality, and reproduction.

Unfortunately, time has given the lie to certain assumptions made almost a quarter century ago, and even then some of the generalizations in this essay must have seemed overly facile. Nevertheless, population geographers will find themselves in accord with many of Halbwachs' ideas. His principal interest is the relationship between population distribution and social process, social actions, and even social psychologies, whereas the population geographer is concerned primarily with distribution of population in its areal co-variance with distribution of other phenomena. If Halbwachs does indeed speak for sociologists, however, there would appear to be much common ground for population geographers and sociologists to till jointly.

JOHN FRASER HART
Indiana University

The Stages of Economic Growth. W.W. ROSTOW. Cambridge University Press. New York. 1960. xii and 179 pp. illust. $1.45.

Geographers who are interested in the economic interpretation of history will find this little volume interesting and profitable reading. Although the author is specifically committed to presentation of a capitalist refutation of Marxist doctrine, his observations concerning relationships between stages of growth and national policies among modern nations promise to be of particular interest to students of political geography.

The principal framework of the study consists of a set of hypotheses, which are presumed to identify the stages through which nations progress from relatively simple social conditions to the complex societies which characterize major powers of the modern world. These progressions are illustrated by analyses of national areas such as Russia, the United States, Sweden, and Japan in which each of those nations is identified with a particular stage of growth. Once those stages are identified, the author is in an effective position to examine alternative courses of future political action.

H.H. MCCARTY
State University of Iowa

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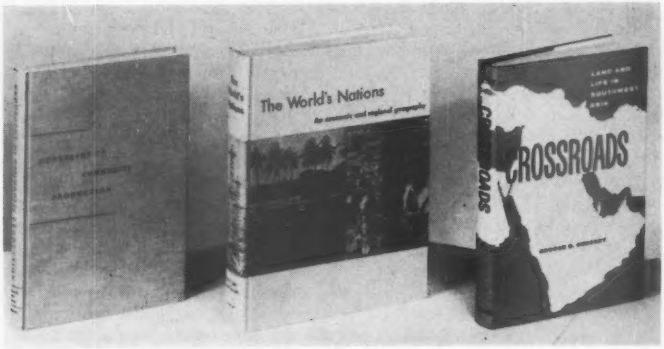

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